SECTION ONE

WHY DO BRILLIANT PEOPLE BELIEVE NONSENSE? BECAUSE THEIR ATTITUDES MAKE THEM VULNERABLE

CHAPTER 1

THEY'RE OVERCONFIDENT

"And if I claim to be a wise man,
it surely means that I don't know."

— *Kansas* ("Carry on My Wayward Son")

"It's not so much what people don't know that hurts them;
it's what they do know that ain't so."

— Mark Twain

A TV Series That Couldn't Possibly Work

The top executives at Disney—drawing upon their years of experience in the entertainment industry—expressed their total disdain for a new series that their ABC network underlings were pushing. Their expert opinion?

- "This is a waste of time."
- "That's never going to work."

On a scale of one to ten, with ten being the best, the CEO graded it a two.[1]

But its creator, Lloyd Braun, against the recommendations of his superiors, moved forward with the pilot for "Lost," which became ABC's first breakout hit in years, topping all the ratings, capturing the imagination of millions of followers, winning an Emmy Award for Outstanding Drama Series and a Golden Globe for Best Drama.

Yet, even after seeing the pilot, the CEO was singularly underwhelmed. "*Lost* is terrible," he complained, "Who cares about these people on a desert island?"[2] Although millions of viewers ended up caring, Braun was fired before the series even started.

How could the experts, with their many years of experience in the field, totally miss the public appeal of this series?

I'd suggest that, with education and experience in a field, overconfidence can creep in. By losing touch with viewers, customers, and colleagues, industry leaders can subtly transform from wisdom *seekers* to wisdom *dispensers.* Whether or not this accurately explains the Disney

debacle, it almost certainly explains many other top-down business and personal decisions that in retrospect look foolish.

From my experience and study, pride, overconfidence, and arrogance lead to more nonsense than failing to detect logical fallacies. These traits will come up repeatedly in this book. A quest for truth requires the humble recognition that I might be dead wrong, even in my area of expertise. The arrogant collect information, not so much to search for truth, but to reinforce their prejudices.

By contrast, the great philosopher Socrates challenges us from millennia past that his greatest intellectual achievement—that which set him apart from the masses—was his realization of how little he knew.[3] Thus, he strove to humbly follow the evidence wherever it led.[4] So before we examine common errors in research and reasoning, let's reflect upon this foundational attitude for the seeker of truth.

He Never Stopped Learning

Some mega-successes resisted the urge to become overconfident, so that they never stopped humbly learning. Consider Sam Walton.

Walton built Walmart—the world's largest retailer—from scratch, fueled by his voracious, unrelenting search for retailing wisdom. Even after he acquired an arguably unequalled knowledge of retailing, he remained more of a learner than a teacher.

- He spent many a Saturday morning at 4:00 AM sharing donuts with his truck drivers, getting their perspective on how different locations fared. This is one of my favorite mental pictures of a humble wisdom-seeker: the greatest retailing mind on the planet munching a donut across the table from his truck drivers, gleaning wisdom from those who see the inner workings of his stores from an angle he might never see.[5]

- Once a week, he met with his store managers, so that they could mutually learn from their failures and successes.[6]

- He seemed to spend as much time in competitors' stores as his own, gathering fresh ideas.[7]

- He attended seminars, read reports, and drained industry leaders of their wisdom. Note how the executive vice president of the discounters' trade association in New York City described his first meeting with Walton (another of my favorite mental pictures of Walton):

> "So in comes this short, wiry man with a deep tan and a tennis racket under his arm. He introduced himself as Sam Walton from Arkansas. I didn't know what to think. When he meets you, he looks at you—head cocked to one side, forehead slightly creased—and proceeds to extract every piece of information in your possession. He always makes little notes. And he pushes on and on. After two

> and a half hours, he left, and I was totally drained. I wasn't sure what I had just met, but I was sure we would hear more from him."[8]

Listen to Walton as he expresses his humility in passionately pursuing ideas:

- "I learned a lesson which has stuck with me all through the years: you can learn from everybody. I didn't just learn from reading every retail publication I could get my hands on, I probably learned the most from studying what John Dunham [a competitor] was doing across the street."[9]

- "Great ideas come from everywhere if you just listen and look for them. You never know who's going to have a great idea."[10]

- "I'd still say that visiting the stores and listening to our folks was one of the most valuable uses of my time as an executive. But really, our best ideas usually do come from folks in the stores. Period."[11]

Contrast Walton with managers who never ask the part-time workers for their ideas, the professor who never asks her colleagues or students for input to improve her teaching, or the physician who fails to listen to his patients. Those who stop learning make decisions based upon their whims, or warmed-over ideas from decades past, which might be as irrelevant to today's world as cassette tapes and floppy disks.

Opening the Idea Floodgates

Yesterday's great ideas can become today's nonsense. What worked last year might not work this year. That's why we need to insure a steady flow of fresh ideas. Jack Welch, one of the most successful business leaders of our time, implemented processes at General Electric to allow the free flow of ideas. These processes led to transforming a lumbering, behemoth company into an innovator that acted like a startup.

Rather than trusting in their extremely talented and educated top management to generate the best ideas, Welch encouraged everybody, from all levels of GE, to share their ideas. But a roadblock exists in many, if not most companies—a part of the company culture that stifles fresh ideas.

Welch explains:

> "I have always been a huge proponent of candor. In fact, I talked it up to GE audiences for more than twenty years. But since retiring from GE, I have come to realize that I underestimated its rarity. In fact, I would call lack of candor the biggest dirty little secret in business. What a huge problem it is. Lack of candor basically blocks smart ideas, fast action, and good people contributing all the stuff they've got. It's a killer."[12]

Why is the candid exchange of ideas so rare? Often our supervisors aren't open to new ideas, either because they're intimidated or aloof. (Isn't it intriguing how two seemingly opposite

traits—insecurity and pride—can manifest themselves in precisely the same attitudes and actions?)

Welch identified this problem at GE. To overcome it, when he gathered people for training, he'd ask their managers to leave the room. With the intimidating presences safely out of earshot, people felt open to share. When the managers returned, the participants had distilled the best ideas to recommend for implementation.[13]

Consequently, GE's ordinary workers felt valued; their voices mattered. Finally free to speak his mind, a middle-aged appliance worker lamented:

> "For 25 years, you've paid for my hands when you could have had my brain as well—for nothing."[14]

How tragic! Twenty-five years relegated to silence. Yet doesn't he represent multitudes of workers and students, who seldom get asked for their candid input?[15]

The Point

Why do brilliant people believe nonsense? Some become convinced—by their grades, degrees and experience—that they don't need constant input from others. They're overconfident. By blocking or ignoring candid input, they set themselves up for dumb mistakes. By tearing down those walls, humble learners unleash a torrent of fresh ideas to keep themselves challenged, fresh, and growing.[16]

Remember, it took a child to notice that the Emperor had no clothes. It took a teen to notice that Apple's proposed headquarters looked like…well…something they certainly didn't want to be remembered for. Perhaps showing the humility to run our ideas by a spouse or roommate or child or student could save us from more nonsense than reading ten academic books on logical thinking. For this reason, I'll return to this theme in later chapters, showing how it often helps us to overcome obstacles we face on our quest for truth.

Action Points
Overcoming Overconfidence

1. Keep your pride in check.

Were you brought up like those in the fictional town of Lake Wobegon, "where all the women are strong, all the men are good looking, and all the children are above average?"[17] If so, don't be surprised if you focus on your strengths, ignore your weaknesses, and view your coworkers and fellow students as a bit slow. Most male drivers surveyed think they drive better than average.[18] Go figure.

So identify attitudes that inhibit your thinking, that block a constant flow of fresh ideas. Is it pride—the notion that you're so learned that you have little new to learn? Is it a sense of superiority that subtly tells those "beneath" you that their ideas don't count?

If you're overconfident, many top companies will sense your pride and pass on hiring you. As one executive at Google said, "We try to avoid people that have incredibly large egos that are inconsistent with their abilities or are not good at working in teams."[19]

2. Get candid input from peers and superiors.

Surround yourself with people smarter than yourself. Resist the temptation to surround yourself with "yes men" and "yes women." Most of us need two kinds of friends—positive peers to encourage us, and candid peers to keep us realistic and challenged.

Accomplished novelist Terry Kay says that he honed his craft while reporting sports for the *Atlanta Journal*. Under the leadership of sports writing legend Furman Bisher, the writers would meet as a group, read each other's columns, and critique them mercilessly.[20] What an education! Do you have people in your life who will regularly, fearlessly, tell you what they think? If not, who could you give permission to be one of those people?

3. Solicit the wisdom of "normal" people.

When brilliant film director Steven Spielberg was directing the hit film E.T., he asked seven-year-old actress Drew Barrymore what she would say if she were writing a certain line. He went with her response.[21] So if you're a young, aspiring artist, why not get your little sister's candid opinion? She just might be more objective than your mom.

As a writer, I may give chapters or entire manuscripts to thirty or more diverse people for candid input. Some are fellow writers or experts in a field; but I learn a surprising amount from young people and those who don't like to read or write. Fellow writers look for cool sentences, clever analogies and grammatical minutia. Non-writers want to know if it's interesting, useful, and makes sense. I gave an early chapter of my personal finance book to an eighth grade writing class, even though the book targeted older teens and adults. Their input was first rate.[22]

4. Reap more from your reading and classes.

By far, most of my students don't enter my classes as passionate seekers of wisdom. Instead, they focus myopically on identifying and remembering what they might need to know for a test, seemingly giving little thought to gathering wisdom for life.

By contrast, I interviewed Ajit Gupta, a Silicon Valley entrepreneur from India who's disrupting the communications industry with his novel approaches to solving communication and data sharing issues. When he studied for his master of arts degree at the University of Alabama, he went beyond reading and listening to lectures for the purpose of merely passing tests. Instead, he looked for ideas that he could use for his future business pursuits. When he came across a useful idea, he'd put it in a box. So when he graduated and moved to Silicon Valley, he arrived with more than just a degree. He arrived with seven boxes full of ideas, the most promising of which he pursued in his business ventures.

As a result, Gupta holds 12 technology patents, sold one of his companies for the stock equivalent of about $500 million and keeps innovating with his new company, recently winning "The Big Idea Award" for the most disruptive business model at the 2013 Innovator Awards.[23]

Other people collect ideas through applications such as Evernote, which can sync with their smart-phones, iPads, desk-top computers and other devices. Still others make notes in their e-books for later reference. I tend to buy used paper books, so that I can mark them as I read and index them in the back (e.g., I might write, "great idea for creativity, p. 15") for ideas I might use in the future.

Questions That Can Identify and Avert Pride-Induced Disasters

1. Who are some "normal" people who might be valuable sounding boards for my ideas?

2. Do I have an emotional stake in an issue that makes the outcome more than a matter of evidence? Who might I consult to get a bigger picture?

3. Is my level of certainty on an issue warranted by the strength of the evidence?

4. Have I read or heard out the top proponents of opposing views with an open mind?

Flex Your Neurons!
Pursuing the Point of Know Return

1. What were some of your parents', friends', and associates' most disastrous decisions? How could a bit more humility, or candid input, have possibly averted these disasters?

2. Do you know people who believe a truckload of nonsense, but believe it's brilliant? Why do you think they believe it?

3. What advice would you give a friend or colleague to reveal how her pride is resulting in poor decisions?

4. What were some of your most memorable misjudgments?

5. What actions and attitudes could help prevent such beliefs and decisions in the future? Could asking others for candid input, or casting the net for ideas more widely have helped? If so, how?

6. Many of us detest the behavior of certain large corporations. I certainly don't agree with everything the leaders of Walmart and General Electric do. For this reason, some people resist learning from such organizations. How can we learn to sift the good from the bad so that we can open our minds to excellence wherever it may be found?

7. If Sam Walton and Jack Welch were working in your realm of influence (family, vocation, education, community service, etc.), how might they stifle arrogance, welcome candor, and unleash a steady flow of fresh ideas?

8. In your work, how often are you asked for input? Do you feel you have good ideas to offer, if only people would ask in the right way? How might this insight influence your style of leadership, now or in the future?

9. Do your coaches or parents or teachers or other authorities ever ask you how you would run things if you had the authority? Would regularly asking your advice be a good idea? Why or why not?

10. Are there times when candor can be harmful? If so, in what situations?

Recommended Trails
For the Incurably Curious and Adventurous

1. To see how Sam Walton started a company that encouraged ideas from all levels, read *Sam Walton: Made in America*, by Sam Walton, with John Huey (New York: Doubleday, 1992).

2. To see how Jack Welch transformed an old company that tended to rely on management for ideas, into a company that acted more like a nimble, young start-up, soliciting ideas from all levels, read *Winning,* by Jack and Suzie Welch (New York: Harper-Collins, 2005), especially chapter two on "candor." See also *Jack: Straight from the Gut*, by Jack Welch, with John A. Byrne, (Warner Business Books: New York, 2001), especially chapter 12 on transforming GE's training center into an idea factory.

3. To see how Pixar Animation and Disney Animation use a "Braintrust" to get fresh ideas in the early stages of their films, moving them "from suck to not suck," read *Creativity Inc.: Overcoming the unseen forces that stand in the way of true inspiration,* by Ed Catmull, with Amy Wallace (New York: Random House, 2014), especially chapter five, titled "Honesty and Candor."

4. This is a great article to see how successful companies encourage and manage creativity: Managing for Creativity, by Richard Florida and Jim Goodnight, *Harvard Business Review*, July 2005.

Making It More Personal
Practical Takeaways

"Our thoughts are so fleeting. No device for trapping them should be ignored."

— Henry Hazlitt

In each chapter, I include this section to help you consolidate your takeaways. It takes only a few minutes; but without taking time to do a final reflection, you'll likely finish the book with a blur of ideas that never impact your life. In the final chapter, I'll ask you to reflect back on these takeaway sections to consolidate your main thoughts and set ten of them as personal goals.

Writing takeaways requires engaging your higher level thinking, reflecting on your own personality and interests and strengths and weaknesses and life direction, and creatively deciding which ideas apply most profoundly to your own life. Use the questions to start your thinking. You don't have to answer all three questions if only one or two reveal your main takeaways.

What are one or more ideas provoked by this chapter that you can apply to help you think more critically?

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What are one or more ideas that you can apply to help you think more creatively?

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What else do you want to make sure you don't forget?

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CHAPTER 2

THEY'RE UNDER CONFIDENT
Challenging Expert Opinion Through Research in a Digital Age

"*Beware of false knowledge; it is more dangerous than ignorance*."

— George Bernard Shaw

"Blind respect for authority is the greatest enemy of truth."[1]

— Albert Einstein

In fleeing overconfidence (Chapter One), don't run to the opposite extreme—under confidence—which can prove just as frustrating in a search for truth. The under confident may fail to engage critical issues at all, reasoning:

> "Who am I to question brilliant experts who've spent their entire lives studying and reflecting? I'll just find the experts and trust their conclusions."

But trusting experts can be dangerous business, because experts spout nonsense as well as truth. Yet many continue to trust them uncritically, because after all, *they* are the experts, not us.[2]

To help break the debilitating spell that experts often cast, let's reflect upon some of their confident pronouncements that didn't turn out so well.

Music Critics

On Elvis Presley:

"You ain't goin' nowhere...son. You ought to go back to drivin' a truck." (manager of the "Grand Ole Opry," firing Elvis Presley after his first performance)[3]

On The Rolling Stones:

"The singer will have to go." (the Stones' new manager, assessing Mick Jagger in 1963)[4]

On the Future of Rock Music:

"It will be gone by June." (*Variety*, 1955)[5]

On Johann Sebastian Bach:

"[Bach's] compositions are deprived of beauty, of harmony, and of clarity of melody." (composer and music critic in *Der critische Musikus*, Hamburg, May 14, 1737)[6]

On Ludwig van Beethoven:

"Beethoven's Second Symphony is a crude monstrosity, a serpent which continues to writhe about, refusing to expire, and even when bleeding to death (Finale) still threshes around angrily and vainly with its tail." (A review written after the first Leipzig performance, in *Zeitung fur die elegante Welt*, 1828)[7]

"An orgy of vulgar noise." (Louis Spohr, violinist and composer, on Beethoven's Fifth Symphony, 1808)[8]

Literary Critics

On Charles Dickens:

"We do not believe in the permanence of his reputation.... Fifty years hence...our children will wonder what their ancestors could have meant by putting Mr. Dickens at the head of the novelists of his day." (*The Saturday Review*, London, May 8, 1858)[9]

On William Faulkner:

"The final blowup of what was once a remarkable, if minor, talent." (Review in *The New Yorker*, Oct. 31, 1936. Thirteen years later Faulkner was awarded a Nobel Prize for Literature).[10]

On Mark Twain:

"A hundred years from now it is very likely that [of Twain's works] 'The Jumping Frog' alone will be remembered." (Harry Thurston Peck, editor of *The Bookman*, Jan., 1901)[11]

On Walt Whitman:

"...Whitman is as unacquainted with art as a hog is with mathematics." (*The London Critic*, 1855)[12]

Publishers

Editor of the *San Francisco Examiner*, rejecting Rudyard Kipling's submission:

"I'm sorry, Mr. Kipling, but you just don't know how to use the English language."[13]

Film

Will the film succeed?

MGM production executive advising co-founder Louis Mayer to not bid on the rights for *Gone with the Wind* (Mayer took his advice and passed):

"Forget it, Louis, no Civil War picture ever made a nickel."

"*Gone with the Wind* is going to be the biggest flop in Hollywood history. I'm just glad it'll be Clark Gable who's falling flat on his face and not Gary Cooper." (Actor Gary Cooper commenting on his turning down the part of Rhett Butler. Adjusted for inflation, *Gone with the Wind* was the most successful film ever made.)[14]

Will the actors succeed?

MGM executive on Fred Astaire's screen test, 1928 - "Can't act. Can't sing. Balding. Can dance a little." (Astaire went on to star in 31 musical films, eventually deemed the fifth "Greatest Male Star of All Time" by the American Film Institute.)[15]

"You have no talent" - Universal Pictures executive to actor Burt Reynolds.

"You have a chip on your tooth, your Adam's apple sticks out too far, and you talk too slow." - Same executive to Clint Eastwood. (Both Reynolds and Eastwood went on to become the most profitable actors of the 1970's, still playing successful roles today.)[16]

Technology

Electric lights will never make it

"...unworthy of the attention of practical or scientific men." (Conclusion of a committee, commissioned by the British Parliament, reporting on Edison's incandescent lamp, c. 1878)[17]

"When the Paris Exhibition closes electric light will close with it and no more will be heard of it." (Erasmus Wilson, professor at Oxford University, 1878)[18]

Record players will never make it

"The phonograph...is of no commercial value." (Thomas Edison, 1880)[19]

Radio will never make it

"The radio craze...will die out in time." (Thomas Edison, 1922)[20]

"I am reported to be 'pessimistic' about broadcasting.... The truth is that I have anticipated its complete disappearance.... …[People] will soon find a better pastime for their leisure." (British author and historian H.G. Wells, 1928)[21]

Television won't make it

"Video won't be able to hold onto any market it captures after the first six months. People will soon get tired of staring at a plywood box every night." (Darryl F. Zanuck, head of 20th Century-Fox Studios, c. 1946)[22]

Computers won't make it

"Worthless." (Sir George Bidell Airy, Astronomer Royal of Great Britain, speaking of the "analytical engine" invented by Charles Babbage, 1842.[23] Airy's opinion resulted in the British government discontinuing funding for Babbage's work in mechanical calculation. Today Babbage is considered the inventor of the computer.)

"I have travelled the length and breadth of this country, and have talked with the best people in business administration. I can assure you on the highest authority that data processing is a fad and won't last out the year." (Editor of business books at Prentice-Hall publishers, c. 1957)[24]

"There is no reason for any individual to have a computer in their home." (Ken Olson, President of Digital Equipment Corporation, at the Convention of the World Future Society in Boston, 1977).[25]

It's impossible to produce atomic energy

"There is not the slightest indication that [atomic] energy will ever be obtainable. It would mean that the atom would have to be shattered at will." (Albert Einstein, commenting sometime after 1931. The atom was first "shattered" seven years after his comment.)[26]

On smoking and cancer

"If excessive smoking actually plays a role in the production of lung cancer, it seems to be a minor one." (Dr. W.C. Heuper, National Cancer Institute, *NYT*, April 14, 1954.)[27]

On economic forecasting

These pronouncements came just before the stock market crash of 1929, which sparked The Great Depression:

"Stocks have reached what looks like a permanently high plateau." (Irving Fisher, Professor of Economics at Yale University, Oct 17, 1929, seven days before the crash.)[28]

"[1930 will be] a splendid employment year." (U.S. Department of Labor, Dec. 1929)[29]

The end of the age of invention

"Everything that can be invented has been invented." (Charles Duell, Commissioner of the U.S. Office of Patents, in trying to persuade President McKinley to abolish his office, 1899.)[30]

Reflections

Foolish quotes by experts are by no means rare. My main source for the above quotes, *The Experts Speak*, by Christopher Cerf & Victor Navasky, contains about 2,000 expert pronouncements that later proved to be nonsense. Yet, we continue to trust in and quote experts, often as slam dunk evidence to prove a point.

Why do brilliant people believe nonsense? Because they often swallow expert opinions without critically reflecting upon them.

Obviously, I'm not out to discount all experts and their opinions. Many people draw foolish conclusions by *failing* to consult experts. But it's one thing to respect them, quite another to follow them blindly. The frequency of their folly, confidently proclaimed in our most trusted publications, warns the wise against uncritical acceptance. Many bow in reverence to experts of every sort and far too many students mindlessly memorize the opinions of their professors. After all, who are we to question a PhD in her field?

Honing our Research Skills with a Contemporary, Vital Issue

None of the above quotes were recent. To discover if today's expert opinion has reached a higher plane, let's examine some contemporary pronouncements in a field that's of vital interest to all of us: medicine.

With scientific knowledge readily accessible through the Web, we'd expect today's experts to be more informed and less liable to spout nonsense, particularly in high stakes, scientifically-based fields like medicine. So let's consult trusted medical sites concerning that most common of all infectious diseases—the common cold.

The importance of accurate information concerning colds is hard to overestimate. In the United States alone, colds account for 40 percent of all absences from work, with an economic impact exceeding $20 billion per year.[31] And colds can be dangerous. It's not uncommon for colds to lead to pneumonia and even death, particularly among the elderly.

The following story is fictitious, but I gathered the quotes from authoritative medical sites in January of 2014. By patiently engaging in "Julie's" research, we can pick up a few tips to sharpen our own quest for truth. And don't merely grasp her method—catch her passion!

Level 1 Learning - Hear an Expert Opinion

Julie's daughter Jade is begging to play outside in the sandbox, but it's the first cool and breezy day of Fall. A year ago, Jade caught a cold that progressed to a harrowing bout with pneumonia, so Julie is understandably cautious. Besides, her family is flying in for Thanksgiving at the end of the week and she doesn't want illness to spoil the festivities.

Julie's mother always swore that exposure to cold can lead to colds, but Julie's know-it-all best friend, Mandy, assured her that cold weather has nothing to do with it. "Colds are caused by viruses," Mandy proclaimed smugly. "A respected doctor cleared that up for us at the 'Raise Them Right' parenting conference."

Level 2 Learning - Consult a Site or Article or Book that Summarizes Expert Opinion

But Julie's not so sure. Mandy's dead certain about almost everything, but in the end seems to strike out as often as she hits homers. Even if cold weather isn't the *immediate* cause, couldn't it be a *contributing* cause, like weakening the immune system? And no single doctor, no matter how well respected, is omniscient. Wouldn't it be wise to consult other doctors, or an authoritative medical site that consolidates their wisdom?

So Julie opens her trusty laptop on the kitchen table and asks Google, "Can cold air cause colds?" But to bypass the pop advice, she wisely adds to her search, "*WebMD*," billed as "The leading source for trustworthy and timely health and medical news and information."

"It's so easy these days," reflects Julie, "to get authoritative information through the Web!" Sure enough, with a couple of clicks, she gets her answer in 10 seconds flat. Now it's Julie's turn to feel smug.

At least for a moment.

Here's what she reads:

> "Cold weather…does not cause colds—at least not directly. Despite its name, the common cold is not caused by cold." "It doesn't have any effect at all….There's no correlation," says a cold and flu expert.

*__Correlation__ = A relationship or connection between two or more things.
Think: "Co-Relation"
Example: "There's typically a correlation between the height of children and the height of their parents."

Julie's response: "Well, that's rather convoluted. The first sentence hints that there might be an *indirect* correlation***** between cold weather and colds. Then the expert assures me dogmatically that it has no effect whatsoever—"no correlation."[32]

"That sounds like a clear contradiction. If I cut some-one's jugular and he dies, would the same expert insist that neither I nor the knife were causes, since the "direct" cause was the loss of

blood? At the very least WebMD should call it a correlation. (Jade impatiently knocks on the door with her sandbox toys.) Don't these writers know that multiple causes can be 'contributing causes,' both directly and indirectly? Either might keep me from opening the door for Jade."

Think!

If you were Julie, where would you look for more information at this point in your quest?

Level 3 Learning: Compare Other Summaries of Expert Opinion

Julie decides to consult other authoritative medical sites.

(**Note to reader**: Please resist skimming this section. Although it's a bit tedious, sound research requires dogged diligence and saintly patience. If you're reading this as an assignment, try to forget for a moment that it's school work. Instead, imagine yourself to be Indiana Jones or Sherlock Holmes, obsessing on solving a mystery where lives are at stake, which is certainly the case with this issue.)

- ***Medicalnewstoday.com*:** (This site promises to give up-to-date medical facts.): "Experts say that going out when it is cold does not have any effect on the risk of catching a cold or spreading one."[33]

  Julie's Response: "Hmm...so 'not any effect' would seem to rule out cold air as both a direct and indirect cause. But that contradicts the 'at least not directly' statement from WebMD. Also, neither of these first two articles were documented with primary sources. I'd better look further."

- ***Everyday Health*:** (Claims peer review by top medical experts at places like Harvard.) This site underscores the WebMD sentence, stating that exposure to cold weather can be an indirect contributor, but fails to tell how it might contribute.[34]

  Julie's Response: "That's not helpful, since it lacks the specifics I need. If the "indirect" cause is that more people gather inside and spread germs during cold weather, then this wouldn't impact Jade going to the sandbox."

- **The respected *Merck Manual***, billed as the most widely used medical textbook, states: "Susceptibility to colds is not affected by exposure to cold temperature...."[35]

  Julie's Response: "Another dogmatic statement that seems to ignore indirect causes, if there are any. But this is a respected source that medical professionals use for reference!"

- ***MayoClinic.com*:** (Connected with one of the most respected clinics in the world.) This site says you're more susceptible to colds in Fall or Winter *because that's when more people are indoors*.[36]

  Julie's Response: "Bingo! So that's the supposed correlation! Jade, put on your hat and jacket!"

  "But I'm losing faith in these supposedly authoritative sources. They contradict one another; some internally contradict; none so far are documenting their sources and none are very thorough. And besides, here in Atlanta people stay indoors, not just when it's cold, but when it's too hot and muggy. If "more people indoors" is the culprit, why don't colds peak during midsummer in south Georgia and Florida? Perhaps just a few more sources...."

- According to the U.S. Government sponsored ***National Institutes of Health* (NIH)**, "Researchers still haven't identified the causes of 20 to 30 percent of adult colds, presumed to be viral."[37]

- **Julie's Response:** "PRESUMED!?! Now *this* is demoralizing. All the other "experts" told me that colds were caused by viruses, period, which seemed to rule out getting a cold directly from exposure to cold weather. Now I'm informed that for one fifth to one third of colds, we don't really know their cause! So how can we know that exposure to cold *isn't* a contributing cause in these cases?"

- **NIH:** "Seasonal changes in relative humidity also may affect the occurrence of colds. The most common cold-causing viruses survive better when humidity is low—the colder months of the year. Cold weather also may make the inside lining of your nose drier and more vulnerable to viral infection."

  "Although a connection exists between the number of cases of the common cold and the fall and winter seasons, there is no experimental evidence that exposure to cold temperatures increases the chances that you will get a cold."[38]

  Julie's Response: "So theoretically, according to the NIH, cold weather *could* be a culprit in causing colds, but we don't yet have the experimental evidence showing it. This is a far cry from the "expert" who assured me in no uncertain terms, "It doesn't have any effect at all." Perhaps some of those earlier articles hadn't been updated by recent studies. This one was last updated in May of 2011, two and a half years ago."

- ***The Centers for Disease Control and Prevention***: The CDC is America's health protection agency. It has a section on preventing colds, which says nothing about limiting exposure to cold.[39]

  Julie: "I wonder if other countries are accessing different information or interpreting the research data differently. When I lived in Slovakia, parents were hyper about their kids getting the least bit cold. Let's check a European site." (Jade is getting hot in her coat and absently pulls at the computer cord for attention.)

- **National Health Service**: ("The NHS is one of the world's largest publicly funded health services.") According to this UK site, "The only thing that can cause a cold or flu is a cold or flu virus. Getting cold or wet won't give you a cold. However, if you are already carrying the virus in your nose, it might allow symptoms to develop."[40]

  Julie's response: "Now *that's* convoluted! The first sentence contradicts the USA's National Institute of Health, which stated that for up to a third of colds, we don't yet know the cause. If the NIH is right, the NHS statement is a presumption rather than a statement of fact, and should have been stated as such."

  "But let's assume, for the sake of argument, that the first statement *is* correct. If so, the second sentence draws a conclusion from the first statement, but equivocates***** on the word "cold." In the first sentence, "cause a cold" means that the flu virus has multiplied enough to cause symptoms, which agrees with common usage and definitions. But the second sentence ("Getting cold or wet won't *give you a cold*") uses a similar phrase to mean something entirely different: "to get some cold viruses in your nose, whether or not they multiply and develop symptoms."

  ***Equivocation** = A logical fallacy in which a person uses a word to mean multiple things, while appearing to use the same meaning throughout.

  "Significantly, we've just shifted to an obscure definition, invalidating the argument. No doctor says 'You've got a cold' solely because you have 25 microscopic cold viruses lying dormant in your nose, but no symptoms. Every medical site I've read begins by defining a cold with its symptoms. Now they want to change the meaning mid article, effectively muddying the waters!"

  "If they stick with the common definition, this article should have more precisely concluded: 'Getting cold or wet won't put cold viruses into your nose. But if you're already carrying cold viruses, getting cold or wet could allow the viruses to enter the body and multiply, thus giving you what we've previously defined as a cold, complete with its symptoms.'"

  NHS: But there's more on this site, a new bit of evidence that none of the other sites mentioned. "A study at the Common Cold Centre in Cardiff found that people who chilled their feet in cold water for 20 minutes were twice as likely to develop a cold as those who didn't chill their feet." 180 students participated in the study.[41]

  Julie's response: "What the...?!? If that was a decent study, then it contradicts the Merck Manual's dogmatic statement that "Susceptibility to colds is not affected by exposure to cold temperature...." It also contradicts the National Institute of Health's statement that "there is no experimental evidence that exposure to cold temperatures increases the chances that you will get a cold."

  "Yet, this study comes from a hotbed of specialized research on the common cold. Cardiff University is one of Britain's leading universities. Its Common Cold Centre has conducted clinical trials and clinical research on the common cold for over 25 years. Dr. Eccles, who

works at the Center and wrote up the study, has written or co-written 65 articles on the cold in peer-reviewed journals over the last decade."[42]

NHS: The authors suggest that some of the people with cold feet were already carrying cold viruses, although they were having no symptoms. Getting chilled caused blood vessels in the nose to constrict, affecting the defenses in the nose and making it easier for the virus to replicate.

Julie's response: "That does it for supposedly authoritative sites that try to summarize the latest evidence for me! The cold feet study was published nine years ago and should have been considered by these sites. I'll dig into the primary studies and summaries of evidence myself, reading the professional, peer-reviewed literature."

Level 4 Learning: Find Primary Sources,* Especially Documented Studies in Peer-Reviewed Literature*

Julie logs into her local library system to search vast databases of peer-reviewed journals. There she finds the primary article reporting the research on the cold feet, plus several other peer-reviewed studies in such respected journals as *The International Journal of Tuberculosis and Lung Disease*, *Acta Otolaryngologica*, the *British Journal of Hospital Medicine, and Family Practice,* all of which suggest that getting cold impacts colds beyond forcing us indoors with more people.[43]

*__Primary Source =__ first-hand testimony or direct evidence about a topic. Example: a researcher reports on his latest research.

*__Peer Reviewed Journals =__ publications in which people report findings from their original research, or summarize prior research. Experts in their fields (their "peers") decide if an article is worthy of publication. In later editions of the journal, experts may add to or challenge earlier articles.

Level 5 Learning: Reflect on and Summarize Results

Julie: "The sites I trusted to consolidate medical science failed me. Their confusing shifts in word meanings, dogmatic pronouncements, internal contradictions, lack of documentation, failure to acknowledge significant studies, and contradictions with similar sites led me astray."

"Enough research for now; I'll try to summarize what I've found. If I define a 'cold' as almost everyone commonly uses it, such as the World Health Organization, it means 'an illness with symptoms such as sneezing and a runny nose, resulting from a cold or flu virus multiplying in the body.'"[44]

Thus I conclude:

1. As the weather gets colder, by each degree Celsius, winter deaths increase. The onset of colder weather, even moderately colder in tropical climates, is correlated with more colds.

2. There is no scientific consensus as to why this happens. Perhaps there are several causes.

3. While the "more people inside" hypothesis surely explains some of the increase in colds, there's no conclusive evidence that it explains all or even most colds. In fact, some scientists note that this hypothesis, as a complete explanation, doesn't make sense and contradicts available data.

4. Competing hypotheses, such as cold air causing nasal blood vessels to constrict and inhibiting the immune response, are consistent with the available data.

5. With Jade's medical history and a family gathering around the corner, the current evidence (at least the portion I was able to find) suggests that letting Jade out in the cold, without a space suit, is a bad idea. We'll watch *Beauty and the Beast* for the 64th time instead. (Jade throws her coat on the floor and with breathless anticipation presents Julie with the treasured DVD.)

The Challenge of Consolidating Wisdom

If our brief excursion into respected medical sites is any indication, many of our most trusted sources have let us down. Why?

Think!

Before I suggest answers, use your higher level thinking to brainstorm: Why would these trusted and supposedly authoritative sites contain such confusing and contradictory data on such an important topic?

On such a critical subject (the cold), in such an important field (medicine), for the most frequented and trusted articles to be in such a deplorable state of disarray suggests that the solution to providing current, accurate medical knowledge runs deeper than updating a few articles. Perhaps their *method* of gathering and disseminating knowledge is somehow flawed. Let's look at some of the problems these sites (as well as general consolidation sources such as *Encyclopedia Britannica*[45]) face.

1. It takes knowledge of a very specialized field to identify the true experts who can write or fact-check any given article. In today's social media, hordes of pseudo-experts want to establish themselves as "thought leaders" and proclaim themselves "experts" and get quoted. Often, although some medical writers may be fairly competent in the general field of "infectious diseases," they may not be up-to-date with the more specialized issue of "causes of the common cold."

2. A successful article will likely result from a team effort. Imagine that writing an article on the common cold fell upon a single individual. She should ideally have mastery of the specialized field, a researcher's diligence, a writer's gift of lively prose, an analytical philosopher's knack for precision, a temperament of dispassionate objectivity, a judge's skill for weighing evidence, and the humility to express conclusions with the appropriate assurance/doubt. How many such people exist? If such a job description requires a team, can these organizations afford to hire competent teams to manage each specialty?

3. Many primary sources, or academic consolidations of research, aren't readily available. Online databases of peer-reviewed articles are far from complete. Older articles or articles from less popular journals are often unavailable, or available only as brief summaries. (Those with access to a university library may be able to get articles scanned into pdf documents and e-mailed from distant libraries.) Often, the most authoritative textbooks cost hundreds of dollars (such as one I found on the common cold), unless they can be borrowed through interlibrary loan.

4. Because of the constant and increasing flood of new information, articles of a medical nature need to be updated quickly as new studies impact the field. Yet, without unlimited funds, how can anyone keep articles on thousands of diseases updated?

5. The above factors mean that enormous amounts of time and money would be required to research, write, and constantly update such huge online databases, as well as medical textbooks. It's likely that, in order to stay within budget, websites of this type simply can't keep up with the ever-increasing flood of information. In other words, don't hold your breath for drastic improvement in these sites over time.

If American sites aren't yet acknowledging a nine-year-old cold feet study done by a respected university in Great Britain, how much less likely are they to consider recent research in Brazil or Burma, especially if it is published in Portuguese and Burmese?

Thus, in the early decades of the 21st century, we often find ourselves information rich, but wisdom poor. Enormous amounts of data exist, but finding the most authoritative data and summaries of that data can be challenging.

Yet, the stakes are high. Nursing home managers might read one of the above sites and conclude that saving money by turning the heat down a few degrees in the winter and putting an additional blanket on each resident is both fiscally and compassionately warranted. If their source was mistaken, they could cause much needless suffering.

How might we overcome this apparently deplorable state of consolidation? How might parents and researchers find consolidated information more effectively?

The Promise of Crowdsourcing*

One path to overcoming the above challenges would be to harness the power of crowdsourcing. After all, Julie, although not a medical specialist, thinks clearly and precisely, not to mention being a tireless researcher. If the consolidation sites she consulted offered to take input, she could point out the contradictions, overstatements, and studies they overlooked.

***Crowdsourcing** = getting input from many people, typically using the Internet.

But for site administrators to read constant input from hordes of people, some valuable and some bogus, and regularly update thousands of articles would require a huge staff of paid editors at a likely prohibitive expense to each organization.

So why couldn't someone set up a website that allows anyone to edit and update, expert or not, as long as they document their sources and state their conclusions clearly and accurately? Julie could recommend updates to the article on the common cold, complete with documentation. Experts who are passionate about the subject, such as those working at the Common Cold Centre at Cardiff University, just might volunteer as gatekeepers to minimize nonsense. Faculty and students doing research in Brazil and Burma could summarize and contribute summaries of their research in English that editors for popular consolidation sites might never find.

Such a site is called a wiki* (from a Hawaiian word meaning "fast" or "quick.")

***Wiki =** a website that allows its users to add to and edit its content.

"That'll never work," I once thought. "It will result in a veritable Pandora's Box of biased, poorly written information, worthless for serious research. It will merely give flat earth advocates a platform for their views." Yet, in the case of a common cold article produced on a wiki, I was dead wrong.

The Value of Wikipedia

While Wikipedia articles vary widely in their quality, making it inappropriate to list as an authoritative source in a serious paper, I'm finding it increasingly valuable in many subject areas as a starting place for research and a guide to important studies.

Let's imagine that Julie had begun her search on Wikipedia. Here's the relevant portion of the article on the common cold pertaining to her specific question: [46]

> Some of the viruses that cause the common colds are seasonal, occurring more frequently during cold or wet weather.[26] The reason for the seasonality has not been conclusively determined.[27] This may occur due to cold induced changes in the respiratory system,[28] decreased immune response,[29] and low humidity increasing viral transmission rates, perhaps due to dry air allowing small viral droplets to disperse farther and stay in the air longer.[30] It may be due to social factors, such as people spending more time indoors, near an infected person,[28] and specifically children at school.[23][27] There is some controversy over the role of body cooling as a risk factor for the common cold; the majority of the evidence suggests that it may result in greater susceptibility to infection.[29]

Note some of the distinct advantages of this article over the earlier sites Julie consulted.

1. Unlike the other "authoritative" sources, every factual statement (in some cases, every clause) is documented, typically with authoritative, peer-reviewed sources. Julie could consult the primary sources and judge for herself whether a Wikipedia statement was warranted. If sections of articles aren't well-documented, Wikipedia administrators warn readers that the section lacks authority, thus imposing a discipline that other medical sites often lack. Significantly, this article contains 93 references to significant sources, compared to few, if any, references on many of the competing sites.

All contributors to the article, rather than pulling their expert cards and expecting people to believe on their authority, are expected to defend their statements with evidence.

2. Wikipedia gives us a much more thorough article than the other sites. Truth is often compromised through abbreviation, when editors impose word limits. This lengthy Wikipedia article will probably continue to grow over time, because servers can now affordably hold vast amounts of information. Electrons are free and silicon (the second most abundant element on earth) is cheap.

3. Wikipedia articles can be updated frequently. I'm writing this sentence the morning after Super Bowl XLVII. Overnight someone, or a team of people, updated Wikipedia's Super Bowl article to include a blow by blow summary of the game. The Wikipedia article on the common cold was updated 30 days ago. Compare this to the article on the National Institutes of Health site, which was updated two and a half years ago.

4. It can handle massive numbers of niche articles. In addition to hundreds of *common* diseases, scientists have identified (so far) about 7,000 rare diseases.[47] If it's difficult to keep articles on *common* diseases updated on traditional medical sites, how much more difficult would it be to inform and update us on every *rare* disease? Crowdsourcing offers the hope that medical specialists and articulate people impacted by such diseases will passionately keep us up with the latest research via Wikipedia articles.

As I write, Wikipedia contains about four and a half million articles, growing at a rate of about 300,000 articles per year.[46]

5. The problem of prohibitive cost was solved. All writers freely volunteer their services. Why? There may be many reasons. But surely it's significant that they're typically passionate about their subjects and want the truth about them to be available. And since the articles aren't copyrighted, contributors don't view their efforts as making someone else rich. It's quite intoxicating to many to know they are contributing to the consolidation of human knowledge in a free environment.

Checking Expert Opinion with Multiple Sources of Different Kinds

Just as articles on medical sites can fall short, Wikipedia's approach has its own weaknesses. Although administrators fight valiantly against bias, it frequently raises its ugly head, particularly on topics where people hold strong, diametrically opposed opinions. On niche topics, such as an article on a business that isn't a household name, or a rare medical condition, a single person may be responsible for the content, with the article reflecting his or her biases and limited knowledge.

For these reasons, researchers should typically consult many sources, including different *types* of sources (encyclopedias, wikis, national health sites, peer-reviewed journals, etc.). As King Solomon wisely counsels us from millennia past: "In an abundance of counselors there is safety."

Summary of Julie's Approach to Evaluating Expert Opinion

1. Hear a presentation by an expert or seemingly informed person.

- Watch a video, like a TED Talk.

- Hear a professor or pastor.
- Read an article.

As you read or listen, keep your mind open, resisting forming an immediate, firm conclusion. Remind yourself, "All I know so far is that this is what one person believes about the subject."

Ask yourself:

- "Is she a specialist in her field?"
- "Is she respected in her field?"
- "Is she representative of her field, or considered a renegade?"
- "Is there a reason she might be biased?"

2. Find a variety of summaries of current research and expert opinion.

- Sites showing authority through their connections or authoritative authors
- Traditional Encyclopedias (e.g., *Encyclopedia Britannica*)
- Specialist Encyclopedias and Reference Sources (e.g., the *Encyclopedia of Philosophy*)
- A crowd sourced resource (e.g., Wikipedia)

3. If you need to go deeper, find the primary sources, looking first for literature reviews***** and consolidation articles in peer-reviewed journals.

4. Summarize your findings.

***Literature (or "Lit") Reviews =** Articles that discuss published information in a particular subject area. Sometimes they simply list the sources with minimal description, but typically they synthesize and summarize the findings/opinions of the authors they cite.

Catch Julie's Passion!

In her quest, Julie never stopped thinking. While she respected medical experts, she didn't swallow their opinions uncritically. This required moving past understanding a sentence or paragraph to pausing for reflection, asking new questions, and comparing the current paragraph to both her life experiences and other statements she'd read. Like Sherlock Holmes, her alert mind sifted evidence, sniffed out inconsistencies, and recognized clues (e.g., the "at least not directly" phrase) to discover new paths that begged to be followed.

Later chapters will help us to refine these skills; but the relentless passion for truth is foundational. Without it, we're unlikely to either fully engage in our research or continue the quest, long after our shoes have worn thin and our feet blistered.

And note Julie's motive. She was driven by her daughter's need—a benevolent, pure need—rather than pleasing a professor or making a killing off publishing her view. As we'll see in later chapters, pure motives are critical for doing objective research.

Action Points
Going beyond Expert Opinion

1. Practice healthy self-talk when reading/listening to experts. Conclude "Now I know what one expert thinks" rather than "Now I know the truth."[49]

2. Look for evidence beyond dogmatic pronouncements. Ask: "What evidence led him to this conclusion? Does that evidence look strong or weak?"

3. Learn how to fully use available resources to dig into primary sources, including search engines, your local library, a university library, etc.

4. Learn how to obtain obscure resources that might be vital to your quest. Consider interlibrary loan, or obtaining scanned copies of studies or articles from distant libraries.

Questions That Can Identify and Avert Expert-Induced Disasters

1. Why should I pay attention to this person? Does she have credentials in this area? Is she truly an expert? Is she a talented researcher who documents her sources?

2. What degree of trust can I put in this publication? Is it known for its objectivity, or does it take a position? Is it sponsored by an organization that might have reason to show bias?

3. Are there other sources I should consult?

Flex Your Neurons!
Pursuing the Point of Know Return

1. How might under confidence hinder your thinking?

2. Why do people often fail to exercise independent thought when they hear an expert or follow a cult leader?

3. Besides overconfidence and under confidence, what other attitudes (e.g., laziness, prejudice) may hinder independent thought and research?

4. How can multi-tasking while researching (e.g., checking Facebook, texting, watching TV) impact our ability to reflect deeply and critically? (Are you multi-tasking now?)

5. What keeps you from fully engaging in your research into subjects vital to you?

6. In this chapter, did the evidence presented show that (choose one);

   a) experts are typically wrong

   b) experts are often wrong

   c) experts are sometimes wrong

   Explain your answer.

Making It More Personal
Practical Takeaways

What are one or more ideas provoked by this chapter that you can apply to help you think more critically?

_____

_____

_____

What are one or more ideas that you can apply to help you think more creatively?

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_____

What else do you want to make sure you don't forget?

_____

_____

_____

Recommended Trails
For the Incurably Curious and Adventurous

1. In this book, see especially Section Three to learn to spot logical fallacies, such as equivocation, in articles and speeches and documentaries.

2. If you have access to premium online research tools/ databases (such as Galileo) through your school or local library, this is a helpful step-by-step introduction to academic research: http://www.lib.vt.edu/help/research/. (Often, your university or local library system can provide you with free access to these tools from your home.)

3. To further sharpen your research skills, Google such phrases as "how to do academic research."

4. If you're doing a long-term research project, e.g., for a company project or a master's thesis, your supervisor will surely recommend resources to guide your search. Additionally, consider a recent work on this subject by Peter J. Taylor and Jeremy Szteiter, who work with the MA degree in critical and creative thinking at The University of Massachusetts, Boston: *Taking Yourself Seriously: Processes of Research and Engagement* (Arlington, Massachusetts: The Pumping Station, 2012). I like their emphasis on getting input from peers and supervisors at every phase of the project, from writing out your proposal, to doing research, to putting your results in writing. This practice seeks to combine the humility of my first chapter (e.g., get candid input from others) with the passionate research of chapter two.[50]

5. For more stupid quotes from experts, see Christopher Cerf and Victor Navasky*, The Experts Speak*: *The Definitive Compendium of Authoritative Misinformation* (New York: Pantheon Books). The original version was 1984, updated by the 1998 edition.

6. To explore some of the reasons why experts are so often wrong, see Philip E. Tetlock, *Expert Political Judgment* (Princeton, New Jersey: Princeton University Press, 2005). This Berkeley professor argues—with impeccable research and evenhanded discussion—that experts in various fields who predict the future are typically less accurate than a collection of reasonably informed people. "The foxes" (who know many little things) tend to predict better than "the hedgehogs" (who know one area of expertise), although the latter are considered the experts and everybody wants to hear their opinions in the media.

7. To understand the strengths and weaknesses of Wikipedia, I enjoyed this history of Wikipedia: Andrew Lih, *The Wikipedia Revolution*: *How a Bunch of Nobodies Created the World's Greatest Encyclopedia*, Hachette Books, 2009.