STORY PROOF

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The Science Behind the Startling
Power of Story

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INTRODUCTION: IT WAS A DARK AND STORMY NIGHT

I once heard it said that life is like chess and that stories are like books of famous chess games that serious players study so that they will be prepared if they ever find themselves in similar straits. I thought it a clever and well-turned phrase—stories form a roadmap for life—until I began the research for this book. Then the profound truth of it struck me full force.

Results from a dozen prominent cognitive scientists and developmental psychologists have confirmed that human minds *do* rely on stories and on story architecture as the primary roadmap for understanding, making sense of, remembering, and planning our lives—as well as the countless experiences and narratives we encounter along the way. Lives are like stories because we think in story terms, make sense out of experiences in story terms, and plan our lives in story terms.

In our enlightened, literate, scientific, rational, advanced world, it is still story structure that lies at the core of human mental functioning. In this age of binary wizardry, ''That reminds me of a story . . .'' or ''Once, back when the world was young . . .'' are still the royal road to meaning and comprehension. In this age of cell phones, Blackberries, and airport cards, human minds are still hardwired to think and perceive through stories.

Everyone loves a good story. An enthusiastic teller begins, ''Once, long ago, deep in a forest that clung to the topmost crags of a distant mountain . . .'' and everyone within hearing sheds their own world and concerns to sink deliciously into the world of the story. Certainly, it has always happened to me and to those in audiences when I perform. I've always taken it for granted. That's just the way it is. Until I began to research this book and I had to consciously ponder the question: why? Why are humans drawn to and entranced by a good story? What's the appeal? Certainly not all narratives possess that appeal, that allure. Only a few enter our memories and linger there for years if not for decades. Why is that? Just luck? I will argue that no, it is not.

In this book I want to lay out the evidence and build my case to prove that stories are more effective and powerful than any other narrative structure. Said

more specifically, I want to prove that stories are more efficient and effective structural vehicles when used to motivate, or to teach and communicate factual, conceptual, and tacit information (attitudes, beliefs, values, and cultural expectations). Stories belong as the bedrock of management, leadership, education, outreach, and general communication efforts.

But if I am to accomplish that, we must first agree on what several terms actually mean: narrative and story. We bandy both terms around quite loosely. Many allow them to slop back and forth interchangeably. Research on the value of stories will have minimal meaning until we have settled on specific definitions for what is and isn't story; what is and isn't narrative. If these key terms don't mean something specific, they don't mean anything useful at all.

Yet we tend not to devote much thought to *story*. Many, hearing me talk about this book, have responded, ''Oh, you're going to write a book about storytelling.'' No. Storytelling (orally telling a story to a live audience) is one—but only one—means of communicating a story. Neither is this a book on the value of story *reading*. That is another means of communicating a story. This is a book about the *thing*, itself: about *story*. Once you understand and master stories, many books can show you how stories may be used.

On a cab ride from JFK Airport into New York City a cabbie asked me what I did. When I said that I tell stories, he said that he told stories, too. I asked if he told in a local storytelling group. He said that he told stories while he drove. I asked, ''To your customers?'' He said, no, his driving *was* his story.

The way he drove was—in his mind—a story, his storytelling. Is that what *you* mean when you say, ''Tell me a story''? Orchestra conductors are often described as storytellers by the way they conduct. Does a musical composer or a conductor ''tell stories'' when they write music or lead an orchestra? Does an artistic painter tell stories?

What *is* a story? What is not? The act of gathering and assessing evidence to answer those questions will sharpen your understanding of this key word and, thus, unlock much of its amazing power to your control. I want to show you that the word—*story*—really has a specific meaning that is defined by specific informational elements and that this structure produces a radically different effect inside the human mind than do other narrative structures.

So, I must first prove that the power and effectiveness of stories comes from these specific informational elements and show that they correspond to how the mind processes narrative information. If so, these elements will define what we really mean when we say ''story.'' For this I'll rely heavily on research from the cognitive sciences, neurological science, developmental psychology, and neural net modeling. We will spend four chapters exploring the inner mysteries of human minds and the wondrous ways in which they process arriving narrative and experiential information.

This effort will expose the myths and misconception, the ambiguities and confusion that abound surrounding the idea of story. It will also peel back the layers of fog to expose the heart and structural framework of successful stories.

This book and its dual set of proofs (first, what a story really is, and second, a story's value for a variety of applications) will benefit anyone who needs to effectively communicate, needs to find ways to more effectively motivate and to create a sense of belonging and of community, or who seeks more effective and efficient ways to teach factual, conceptual, and tacit information. That should cover most of us. We all want to convince, to communicate, to teach, to get

others to see and to share our own vision and images, to effectively reach another human with our words. Stories are a universal expressway to accomplish each of these tasks.

Teachers, sales people, managers, lawyers, clergy, organizational leaders, writers, scientists ... the list of those who can more effectively do what they do through story structure is virtually endless. Stories hold human attention. Stories are understood. Stories ''make sense'' in a way other narratives do not—even stories about the longings of a talking tree stump or about a little girl who decides to commit felony breaking and entering to swipe a bowl of porridge (oatmeal) from the house of the bear family. Stories get remembered and are easily recalled.

This goes for fiction and nonfiction stories alike. It applies to the overall story and to any key information contained within the story. This book will help those to whom communication is important.

The good news is that story—as a specific narrative structure—is not difficult to learn, master, or apply. Just the opposite. Most struggle to write effective narratives and struggle to deliver effective presentations. Understanding and using story architecture makes these jobs easier and more effective.

It turns out that your mind was evolutionarily hardwired long before birth to think in specific story terms. You know now, and have always known, this structure. Your mind uses it every waking hour. However, your internal neural story maps are not housed in the conscious mind. Rather they reside below that level so that they can be automatically, subconsciously applied to incoming information. It is well worth spending some time examining story structure in order to dredge that structure up into your conscious thinking.

USING THIS BOOK

I will weave three kinds of information into the tapestry of my proof in this book: solid research results (both qualitative and quantitative), anecdotal examples to breathe life and clarity into research results, and as many demonstrations as I could stuff in to make the concepts real and personal (and fun) for you. For many—me included—hearing about something isn't enough. I need to see it and to do it in order to truly believe. The demonstrations, I think, are vital to helping you see and understand the power that lies in story form. Through this triad of related streams of information—research, experience, and demonstration—I hope you develop a clear understanding of why stories are so uniquely powerful and effective.

Because I will report on a great many research studies in this book, the temptation has existed to treat it as a dissertation. I have tried to resist that temptation. Stories are supposed to be enlivening as well as enlightening, energizing as well as thought provoking. I have tried to maintain that outlook while writing this book *about* stories. In addition to providing information about stories and the evidence to support their expanded use, I have included sections to serve as guides to the successful application of story concepts.

A few technical notes: This book contains summary references to a vast array of supporting research. I will cite my sources in the text using (author year) notations that link to the full citations in the bibliography.

Several roles are involved in the use of stories. The story creator is either a storywriter or a storyteller. The receiver of the story is either a listener or a

reader. It is far too awkward to repeatedly say ''writer/teller'' or ''reader/listener.'' However, ''creator'' sounds too lofty and ''receiver'' sounds too much like stereo equipment. Thus, I often use ''writer'' and ''reader'' for the sake of simplicity and narrative flow. When you read these terms, reinsert the teller or listener, knowing that I intended them as well, but didn't want to subject either of us to the tedium of including them in the sentence.

THANKS

Finally, I want to thank you, the reader, for taking the time to ponder these important ideas and to explore the potential and wonder of the simple things we call stories. It will be well worth your while.

PART 1

STORY SMARTS

CHAPTER 1

OPENING ARGUMENTS: MORE THAN YOU IMAGINED

I began my research for this book in September 2005, in response to a challenge. I had presented several workshops at NASA's Goddard Space Flight Center advocating the use of story as a more effective medium for science outreach writing. One of those present, who has since become a good friend, lobbied to restructure much of NASA Earth Science's outreach writing into story form. He was stopped by someone at the directorate level in NASA headquarters who said that wasn't how science writers write. "I know it isn't," said my friend. "Story writing is better!"

The director replied, "Prove it." My friend turned back to me and repeated, "Prove it." As we talked, it became clear that a few examples of effective story use would not "prove it" to a skeptical world. It also became clear that I would have to provide a clear definition of story—say what that word means and doesn't mean. We'll begin that job in Chapter 2.

I started this information search expecting to desperately hunt for scraps of evidence to support my case. I expected to be forced to rely on opinion and anecdote. However, I have been overwhelmed by the mountain of available, pertinent, qualitative *and* quantitative, research-based studies. My proof has been substantiated a dozen times over by research from a half-dozen fields.

I readily admit that I am not an unbiased researcher. I came into this project with twenty-five years of full-time work as a storyteller and author. I have seen, on countless occasions, the positive power, benefit, and effect that stories have on audiences. Listeners and readers are entranced for the duration of a "good" story. They long remember stories.

Consider:

- Humans have told, used, and relied on stories for over 100,000 years. Written communication began only 6,000 to 7,000 years ago. Modern expository forms of argument, persuasion, and logic developed well after that. Most Western cultures began, en masse, to read and write only a few *hundred* years ago. Before that, oral stories were the dominant form through which

history, news, values, cultural heritage, and attitudes were passed from person to person and from generation to generation. Current research indicates that stories even predate *language* (see Chapter 3). In the beginning there were stories. Then came language to express story concepts. Then came written language with its grammar and syntax. Only much later did other narrative and expository forms emerge. Evolutionary biologists confirm that 100,000 years of reliance on stories have evolutionarily hardwired a predisposition into human brains to think in story terms. We are programmed to prefer stories and to think in story structures.

- Every culture in the history of this planet has created stories: myths, fables, legends, folk tales. Not all have developed codified laws. Not all have created logical argument. Not all have created written language and exposition. All developed and used stories.
- Research by cognitive scientists has shown that "experiences not framed into story form suffer loss in memory" (Mandler 1984, and Mandler and Johnson 1977). We remember *stories* (and information in stories) better and longer than the same information presented in any other narrative form.
- Canadian researchers found a strong positive correlation between early storytelling activity and later math abilities. They suggested that time spent on stories (telling, reading, and listening to stories) during preschool years improves *math* skill upon entering school (O'Neill, Pearce, and Pick 2004). That says that learning story structure develops logical and analytical thinking as well as language literacy!
- A senior official at the World Bank, Steven Denning, found that "time after time, when faced with the task of persuading a group of managers or front-line staff in a large organization to get enthusiastic about a major change, *storytelling* was the only thing that worked" (Denning 2001).
- In a small, five-school test I personally conducted, one hour of instruction on *story structure* raised writing assessment scores 0.86 (over 25 percent) on state standardized writing assessments even though the assessment writing assignment was to write a persuasive essay, not a story.
- In researching this book, I have reviewed over 350 research studies from fifteen separate fields of science. Incredibly, every one of those studies, as well as every other study they cite—*every one*—agrees that stories are an effective and efficient vehicle for teaching, for motivating, and for the general communication of factual information, concepts, and tacit information. *Not one* doubted or questioned the effectiveness of stories!
- Famed developmental psychologist, Jerome Bruner (2003) pointed out that "stories are surely not innocent: they always have a message." He or she who understands the internal structure of story controls the message. As Lori Silverman (2006) says in her book introduction, "Those who learn . . . and apply its [story's] principles are those most likely to succeed."

It would seem that stories and their supporting evidence are universal. It's an intrinsically human thing to do. We rely on stories like we rely on air, water, sleep, and food. Proving the value of story should feel like an exercise in proving the obvious—something everyone already knows.

However, the studies that will form the core of my proof have had little impact to date, though most have been available for five years or more. Stories struggle to infiltrate into the normal flow of education, of organization and corporate

management, and of governmental agency outreach. More and more institutions seem to turn away from stories just as more research from more fields confirms in more ways and at more levels story's effectiveness and efficiency.

In state after state, departments of education and school districts push second graders into expository writing to inform and writing to persuade instead of letting them focus on learning story structure and story writing. The Language Arts frameworks in many states consider *story* reading and *story* telling to be fluff—pleasant and enjoyable curriculum extras, carrots to dangle over students as a treat during free reading times for completing other, more serious activity. (See Maria 1998 for a discussion of this phenomenon.)

The outreach programs of many governmental agencies prefer to use rigorous academic and technical articles instead of stories as a way to share their research and to—literally—tell their stories to the public. Many then find that their messages are lost, unappreciated, and unheard in the clutter of assumptions, caveats, data, and the distant third-person writing academic articles provide. Many organization and corporate leaders shy away from leading through stories fearing that they will not be taken seriously.

It seems that a litany of research results will not be sufficient on its own to prove the value and power of story. What must accompany such proof was well-defined by a question posed during my NASA conversation: ''What *exactly* are you going to prove?''

My initial answer was that I would prove that stories are a better (more effective and efficient) way to teach and to communicate. By ''communicate'' I mean that stories more readily garner and hold reader's/listener's attention. They more readily create meaning and understanding in a reader's/listener's mind. Stories are remembered better and are more accurately recalled from memory.

My friend asked, ''Better than **what**?''

''Better than other narrative forms.''

''**What** other narrative forms? A poem? A play?''

And this opens the biggest question of all: What does the word *story* really mean? What is a story and what isn't? Research that establishes the value of story will have little value until we agree on what the word *story* means and doesn't mean.

Let's test your story IQ. Which of the following do you think involve a story?

- Uncle Fred perches on a kitchen chair doing his impersonation of the president while he makes up silly policy initiatives.
- Your grandmother quietly tells you about eight generations' worth of family history as she knits.
- You tell your spouse about your day.
- You tell a joke.
- You read an article in *Time* or *Discover* magazine.
- You read a stock report or a computer program instruction book.
- You read an essay your neighbor wants to submit to the Letters-to-the-Editor section of the local paper.
- You read a recipe for venison stew.
- You read a short story in a collection of classic literature.

Are they *all* examples of stories? Which are and which aren't? Why? Intuitively we know there are significant differences between some of these

examples. But are there enough similarities for them all to be called *stories*? I will argue that no, there are not. But that answer leads to a far greater question: what is (and what is not) a story?

Surely, a conversationally delivered chronology of my accomplishments during a day's work won't sway or influence anyone as Denning's stories do. It wouldn't develop logical thinking and math skills as stories did in the Canadian study. Analyzing my ho-hum daily narrative surely wouldn't raise student writing scores. Can my narrative be a story as much as those mentioned earlier?

One way to look at it would be to say that there exists more than one kind of story. However, this approach always leads to confusion and muddies—rather than clarifies—the meaning of the word, story.

Another way is to admit that not all things written in narrative form are stories. Some are. Some aren't.

I strongly prefer this second view. There exist a number of specific narrative forms in the ''non-story'' category that, unfortunately, don't have an agreed-upon moniker in the English language. But they still exist as ''non-stories.'' If we eliminate everything in the non-story category, we should be able to locate the source of the power and effectiveness of *stories* and to then define exactly what a story really is.

Thus, I have divided the book into two parts.

Part 1 explores how human brains and minds process narrative information and identifies the specific informational elements that trigger the creation of meaning, that enhance memory, and that form the central structure of stories. Pulitzer Prize winner Jon Franklin (1986) said, ''He who would comprehend stories, no less than he who would understand universes or temples, must first grasp the nature of their structure and component parts.'' In describing that nature, he said, ''Just as all uniquely individual human beings have brains, hearts, stomachs, and pancreases, all stories have a common set of attributes that are arranged in a certain, specific way.''

The power and effectiveness of stories come from these specific informational elements that form the core architecture of stories and match the informational demands of human neural story maps. In this narrower view of the word, stories are more effective because it is easier for the mind to extract and understand this essential information from something structured in story form.

Part 2 lays out hundreds of rigorous, research-based studies to prove the value of stories for the following key uses of story:

- **Is there a clear link between narrative comprehension and story? Yes**. Reading comprehension is directly linked to understanding story structure. Reading enjoyment varies directly with comprehension.
- **Is there a clear link between writing and story? Absolutely**. Mastering the architectural elements of story arms writers with specific and powerful strategies for creating the content of consistently effective writing.
- **Is there a clear link between story and logical and critical thinking? Definitely yes**. Research shows that mastering story structure is an essential precursor to successful mastery of logical understanding.
- **Is there a clear link between story and motivation? Most emphatically yes**. The elements that define story structure create context and relevance. Those elements create motivation in the reader or listener to pay attention,

process, absorb, and remember the incoming information. Research also shows that stories create a sense of belonging and identification.

- **Is there a clear link between story and memory (learning)? Without question, yes!** The elements that define story structure create context and relevance. Research clearly shows that memory and recall are highly dependent on the existence of these two key measures. Information in story form (and information contained within stories) is easier to remember and to recall. Information not presented in story form suffers degradation and loss in memory and during recall.
- **Is there a clear link between mastering language and story? Again, yes**. Research now supports the contention that story predates human language. Language was created to express stories. Stories and language are inseparably intertwined. Understanding story helps language learners understand the purpose and organization of language as well as the specific vocabulary and grammar presented in stories.

In researching this book, I have read over 100,000 pages of research from fifteen fields that, in some way, touch on how the human mind receives, processes, and responds to stories—neural biology, cognitive science, developmental psychology, clinical psychology, neural linguistics, education, information theory, knowledge management, organization theory, anthropology, narratology, neural net modeling, medical science, narrative therapy, and, of course, storytelling and writing. This included over 350 books and qualitative and quantitative studies as well as over 70 articles that have reviewed and evaluated other studies including analysis of over 1,500 studies and descriptive articles.

I have collected the personal accounts of over 1,300 practitioners (mostly teachers) who have made extensive use of stories in their work. I have added my own informal research on how variations in story structure affect listener and reader understanding and appreciation that I have conducted over two decades of storytelling performances for several million and writing workshops for over 200,000 students and 40,000 teachers.

The mind-boggling and extraordinary truth is that each and every one of these thousands of independent sources agrees with the premise that stories work, that they are effective and efficient. I could not find one shred of evidence to suggest that stories *aren't* effective vehicles to teach, to inspire, to inform, and to educate.

Think about that for a moment. Most scientific literature is a series of contradictory arguments and studies debating an issue back and forth until some common resolve, some preponderance of evidence, is reached. It took well over a decade for the scientific community to agree that global warming is actually happening. There is still—seventy-five years after its discovery—a heated argument over whether Pluto is a planet. Strongly worded positions supported by hard data are published on both sides. Not so with story. All researchers agree.

THE POWER OF STORIES

I switched from a career in science (oceanography) to storytelling because I used to make up stories for one nephew in the park. We'd flop into the sandbox and I would improvise whatever popped into my head. And I consistently drew crowds to listen to those made-up stories. I often glanced up to find a ring of fifty or more people leaning in to hear.

One day it hit me. If I sat in that sandbox and read any of the reports I was paid good money by the Department of Energy to produce, not *one* of these people would slow down to listen. It wasn't me or my voice that held them. It was the *story*. I realized that stories exuded a magnetic attraction that other narrative forms do not.

Stories have started feuds that have lasted for generations. Stories have started wars, but they have also forged alliances. They have changed societal and cultural attitudes, beliefs, and values, as well as swayed public opinion. Stories have redefined and refocused the political and social debate. They have changed and continue to change the world—to define our world. Stories can be amazingly powerful—frighteningly powerful.

We take stories for granted. We use them—in fact, mentally *depend* on them—but rarely pause to pay any attention to this incredible narrative structure we so casually wield. We don't give stories their due. As comedian Rodney Dangerfield would put it, "Stories don't get no respect." But if we take a moment to honor—and even to study—this amazing narrative form, we will find that it rewards us with virtually unlimited communications control and power.

Last fall I led a one-day Girl Scout storytelling workshop. Fifteen fidgety, unruly high-school girls and I were shut up in a classroom for twelve hours on a glorious fall Saturday. They were borderline unmanageable—except when someone was telling a story—me or one of them. It didn't matter who the teller was. It didn't happen when someone *talked*. Only when someone broke into what everyone else recognized as a story. Then they grew still, attentive, eager, literally mesmerized. They couldn't articulate what made one speech a story and another not. But they all recognized and responded to that difference.

Why? How? Is there any information to take away from that one experience? What about from 500 just like it? That's my personal bank of such experiences and I could easily call forth a hundred other storytellers with similar banks of personal testimonials. But is even such a mass of consistent anecdotal support admissible evidence? Over 4,000 people swear that they have actually seen the Loch Ness monster. Does that mean Nessie exists? How much evidentiary weight should their anecdotal sightings carry?

People are eager for stories. Not dissertations. Not lectures. Not informative essays. For stories. No one lines up outside the library to be the first to check out the latest doctoral dissertation. No, it's stories we crave, even though the dissertation may well have more beneficial information and more lasting value for our lives. Such expository narratives feel like bitter medicine. Stories feel like candy.

Stories are also remembered better and longer than information delivered in any other way. I still vividly remember stories read to me during kindergarten and first grade and can still picture the setting and moment when I heard them. I do not remember any factual or expository information fed to me during those years. I don't remember any essays. I don't remember any textbook passages. I remember the stories. I also remember many of the stories I wrote as a child, but cannot recall even one of the many reports, essays, articles, and papers I had to write during my grade school years.

In the spring of 1983 I performed at an elementary school in Yorba Linda, California. I entered the main hallway and passed a second-grade girl heading for the front door. She said, "I remember you. You told us stories last year." (It had been thirteen months since my first appearance at the school.) She then proceeded to tell me one of the stories I had told the previous year. And she got

it all right. It was a twelve-minute, original story; one I had told only a few times. She had heard the story only once in her life and her only instructions at the time were to march into the multipurpose room, sit on the floor, and be quiet. Still, thirteen months later and with no prompting, she dredged that entire story back into her conscious mind and could accurately retell it. I have had the same experience with both children and adults when the gap between one-time hearing and accurate recall has been as long as *eight* years!

How many kinds of narrative information do you accurately and completely remember after one hearing for more than a year? For almost a *decade*? There was no information in the story the second grader heard that was important to her life or education. Still she remembered it. Stories are routinely remembered. Other narrative forms of information are not.

THE INSIDE STORY

Gordon Mills begins his thoughtful (1976) book, *Hamlet's Castle*, with this passage:

> In the spring of 1924 the young German physicist Werner Heisenberg went on a walking tour with the great Neils Bohr in Denmark, Bohr's homeland. The following is Heisenberg's account of what Bohr said when they came to Kronberg Castle:
>
> Isn't it strange how this castle changes as soon as one imagines that Hamlet lived here? As scientists we believe that a castle consists only of stones, and admire the way the architect put them together. The stone, the green roof with its patina, the wood carvings in the church, constitute the whole castle. None of this should be changed by the fact that Hamlet lived here, and yet it is changed completely. Suddenly the walls and ramparts speak a different language. The courtyard becomes an entire world, a dark corner reminds us of the darkness of the human soul.

Story somehow transforms simple stone walls into a vibrant, emotionally charged, meaningful, and exciting landscape. Same stones. Same mortar.

How does the inclusion of a story make them feel different, more important, or more memorable? Is there *proof* that stories work? Is there a single ''smoking gun'' study everyone can point to?

Unfortunately, it's not that simple. A large part of the problem is that story is not a process. Processes (activities) are easier to study. So we study *reading* and *writing* with only minimal regard for *what* is being read or *what* is being written. We study and promote story*telling* without pausing to examine the characteristics of effective stories to tell and the impact of those *stories* on the success or failure of the process of *telling*.

A story is a ''thing,'' a specific narrative structure. It is the framework—a narrative architecture. Story is not the content, but the scaffolding upon which some content (fiction or nonfiction) is hung. All stories are narratives, but most narratives are not stories. Though the term *narrative* (as well as *story*) is tossed about quite loosely in our modern culture, *Webster's Collegiate* and other dictionaries define narrative as a general catch-all word encompassing anything written or told in sentence and paragraph form. Essays, letters, diaries, articles, textbooks, directives, encyclopedia entries, briefs, and lectures, among others, qualify as narrative, but not necessarily as story.

More specifically, *Webster's Colligate Dictionary* derives narrative through this definitional sequence:

Narrate: To tell in writing or speech. To give an account of (happenings, etc.).
Narration: The act or process of narrating.
Narrative: Of or having the nature of narration.

Roger Schank, a famed developmental psychologist, wrote (1990) that ''stories form the framework and structure through which humans sort, understand, relate and file experience into memory.'' We think in story terms which means that we can't think about story without using stories as the foundation of our thinking.

Another titan of the developmental psychology field, Jerome Bruner (1987), said, ''My life as a student of the mind has taught me one incontrovertible lesson. Mind is never free of precommitment. Our precommitment about the nature of a life is that it is a story.'' Educational and linguistic researcher Mark Turner (1996) said, ''There is a general story to human existence: It is the story of how we use story and parable to think.''

The great philosopher Jean-Paul Sartre (1964) said, ''A man is always a teller of stories. He lives surrounded by his own stories and those of other people. He sees everything that happens to him in terms of stories, and he tries to live his life as if he were recounting it.''

Brown (1991) made a list of human universals. Storytelling prominently appears near the top of that list. Taylor (1996) spent a hundred pages building a case for his statement, ''You *are* your stories.'' Philosopher Isak Dinesen said, ''To be a person is to have a story to tell.''

The story of human existence is . . . story.

In one of his more recent books, Bruner (2003) said, ''. . . fiction stories create realities so compelling that they shape our experience not only of the world the fiction portrays, but of the real world.'' He is saying that the structure of story is so powerful that our minds automatically use story elements, story relationships, story architecture to understand, and to make sense out of, the real-world events and people around us. Life is a story because we force ourselves to view it and to plan it as a story!

And that makes story research difficult. Fish don't understand water because they are forever immersed in it and have no other experience, no other reference point, with which to compare ''water.'' We can't feel or sense gravity because we have never been without it. It is difficult for us to look at ''story'' because stories are so interwoven into the fabric of our lives and minds that we can't step far enough away from our storied world to view stories objectively.

These difficulties not withstanding, we will uncover the details of the intersection of mind and story (Chapters 3 through 6) and will then be able to present and review the relevant story research. I believe the proof is there. It lies in the confluence of evidence from the various fields I mentioned earlier. By book's end I believe you will agree that stories are far more effective, versatile, and powerful than you ever thought possible.

It is a fascinating journey that I hope you enjoy.

CHAPTER 2

SO, WHAT *IS* A STORY?

Common myths and misunderstandings prevent most people from effectively understanding and using story structure.

Organizational and knowledge management researchers K. Dalkir and E. Wiseman summed up their frustration by writing, ''Storytelling suffers from one of the major obstacles still encountered in KM [knowledge management]: namely, reaching agreement among practitioners and scholars about what storytelling is and what it is not'' (Dalkir and Wiseman 2004).

The authors of fourteen of the eighteen articles I have read from the field of narratology felt obligated to define what they meant by the word *story* for the purpose of their study. So did over 60 percent of my sources from narrative therapy and a significant number of my sources from organizational management, knowledge management, and cognitive sciences.

Did they all define it the same way? No, not even close.

If confusion and misunderstanding reign supreme in many of the available writings on story, where shall we find a solid basis for creating a defensible definition of story?

First, how would *you* define a story? What do you think is the difference between a story and:

A magazine article?
An essay?
An encyclopedia entry?
A memo?
Anything I want?
A recipe?
A basketball?

A poem?

A directive?

A conversation?

Last summer?

A newspaper column?

A joke?

Are these all stories? Do they all *make* stories? Are *some* stories? Surely, they do not *all* match what we mean when we say *story*! Is there overlap, then, between story and these other narrative forms? What makes some articles stories and some not? What makes some jokes stories and some not? When is an essay a story and when is it not? What *is* a story?

Do you think that the following people all refer to the same thing—even though they all use the same word: *story*?

- An editor growls, ''What's the story?'' to a cub reporter.
- A drama critic searches for a movie's ''dramatic story arc.''
- A therapist asks a patient to recount a rambling series of life events.
- A second-grade teacher asking her students for a half-page story of a dragon.
- A minister begins a recitation of a biblical parable.
- A father barks, ''Don't you tell *me* no stories!'' to a son three hours late for curfew.
- A grizzled detective flips open his notebook and licks his pencil stub as he arrives at the crime scene and growls to the rookie cop who discovered the body, ''So, what's the story?''
- A food critic writes a book on the history and cultivation of the carrot.
- A man drifts across a crowded cocktail party, pauses next to a woman who picks at the shrimp platter, and says, ''So, what's your story?''
- A couple shares the events of the day over dinner.
- A daughter snuggled into bed pleads, ''Tell me a story!'' to her mother.

Do they all mean the same thing when they use the word *story* to describe what they are doing? The answer, of course, is no. But what does that say for your definition of what is and what is not a story? How do you separate the stories from the non-stories?

I've already used the word *story* many times in this book. Did it always conjure a clear, definite, and well-defined image into your mind? Probably it didn't. And that's part of the problem. We typically don't collectively or individually demand a clear understanding of that word. Most are okay with a vague and fuzzy image—until you want to use stories to accomplish your communication goals. *Then* you need to be precise if you want to be successful.

Take a minute to write your definition down. Force yourself to find the specific wording that you think uniquely identifies a story and differentiates stories from narratives that aren't stories.

I have asked thousands of adults and students to define a story. The most often offered answer is that a story has a beginning, a middle, and an end.

True, but so what? What *doesn't* have a beginning, a middle, and an end? A sewer pipe has all three. So does a peanut butter and jelly sandwich. Both the best and the worst prose ever drafted had a beginning, a middle, and an end.

There is no information in such a vague and all-encompassing notion. We need a definition that guides us toward consistently successful and effective stories.

The second most common answer is that a story is when you tell about something that happened. This seems true enough, but look at the lists above. All qualify as, ''when you tell about something that happened.'' It's like the beginning, middle, and end definition. It may be true, but it's far too vague and general to be useful. There has to be more to our definition if it is to empower us to understand and consistently create the power we attribute to good stories.

Some answer that stories spark our imagination. Some say that they create an emotional connection, that they *involve* the reader in the story and get remembered. Many say that stories give readers a sense of satisfaction and completeness, and that stories ''make me feel as if I were there.'' These are all desired *effects* of stories, but do not identify what the thing is that creates the effects.

My favorite answer came from a fifth-grade boy in southwestern Pennsylvania. I asked the question. His eyes bulged. His mouth dropped open. It was clear that he had just squandered one of his life's allotment of epiphanies on this question and that grand concepts had suddenly jelled in his mind. He bolted out of his chair and shouted, ''I know what a story is. It's when you have a subject and a verb!'' I didn't have the heart to squash that kind of enthusiasm. We thereafter called his the definition of a *very short* story.

Why is it so difficult to articulate a succinct definition for story? Everyone has heard stories, read stories, and told stories. Most people come in contact with stories on a daily basis. Stern (1997) said, ''Stories uniquely contain and present both our beliefs and our knowledge about the world.'' That's pretty all-inclusive. Zaltman (2003) pointed out, ''The similarity of store and story is not a coincidence.'' Stories are our universal storehouse of knowledge, beliefs, values, attitudes, passions, dreams, imagination, and vision.

We are forever surrounded by and immersed in our stories. And *that* may be the difficulty. ''We live in stories the way fish live in water, breathing them in and out, buoyed up by them, taking from them our sustenance, but rarely conscious of this element in which we live'' (Taylor 1996).

Much of the confusion over our definition of story hearkens back from three pervasive and counterproductive misconceptions about stories.

THE BLANKET MYTH

Many have the vague feeling that ''*everything* is a story.'' That statement simply is not true. Everything is not a story. Most of your daily life is *not* a story. Most of your conversations are not stories. Much of what you read is not a story. That's not bad. There is no reason for everything to be presented in story form.

If a cognitive science researcher concludes, ''Experiences not framed into story form suffer loss in memory,'' and you think, ''I said 'Hi' to my neighbor,'' or, ''He went to the store,'' are adequate stories to test this claim, you will certainly discount the research. You will rightly conclude that your example story wasn't worth remembering in the first place. The problem is that your example was not a story and so doesn't apply to the stated research.

Nora Ephron, a writer whose work I thoroughly enjoy, described an ''ah-ha!'' light-bulb moment in her new book (2006) as ''. . . the beginning of my understanding that just about everything was a story.''

It's a myth—a sinister, destructive myth. It is one thing for those who thoroughly understand story structure to say, ''Everything is a story.'' They understand the hidden assumptions and mandates that, though unspoken, still constrain and define the meaning of that sentence.

It's like a Home Depot store rep saying, ''Hanging a new door is easy.'' He knows that this simple statement means that I must first square the door frame, then squirt sealer under the new sill, carefully balance and align the hinges so the door won't bind, plane the door to fit the actual opening, and so forth. But *I* don't know that. So I fumble, curse, struggle, and fail. Water pours under and around my new door on the first rain—all because I do not know the implied interconnection between the parts and the physical process of door hanging. The same is true for the parts and sequencing of a story.

Let me correct Nora's statement. ''Any human event can be turned into a story and presented in story form.'' Converting events into stories involves a specific *process* that the sentence, ''Everything is a story,'' ignores.

As an example, consider this event:

The Lone Ranger strapped on his gun belt and walked down the boarding house stairs.

It's not a story yet, just an event. I am sure that exact event happened hundreds of times each day in the Old West—if not to him, then to some other cowboy.

But it could become a story. Perhaps, someone has yelled, ''Help! The bank is being robbed by eight *really* bad guys!'' That's better. It gives the Lone Ranger something to do (a goal) and something to struggle against. Perhaps, the Lone Ranger has been up in his room rubbing liniment into his sore back because his sciatica is acting up. Perhaps his eyesight is growing a bit blurred; his gun hand has noticeably slowed and has picked up a worrisome tremor. He's tired of living out of boarding houses and campgrounds. He hasn't caught any bad guys for three months, fears he's a washed-up has-been, and secretly longs for a flower garden to tend. He suspects that people are beginning to talk and to sadly shake their heads as he limps past. Oh, if only he could make one last grand arrest of a famous bad guy and then retire! The Lone Ranger marches down the boarding house stairs, heart pounding with fear and anticipation and wonders if he still has the right stuff to save the day.

It's not a complete story yet, but now it's getting interesting. Notice, I haven't added any action, but I have given you information about the character—his hopes, fears, worries, and dreams. Since he's over the hill, there's more danger if he goes after eight desperados. There's a greater chance of failure.

Maybe the Lone Ranger's brother is one of the robbers—the brother that raised and protected him, always telling him that family is everything. Now he has a dilemma: uphold the law and arrest his big brother, or honor family and cheapen his badge.

Either way (or through a thousand other character-based scenarios we might create) it's beginning to get interesting. The Lone Ranger has something he must do and conflicts to overcome and resolve along the way.

Remember the Blanket Myth. Everything is *not* a story—but it could become one.

THE BINARY ASSOCIATION MYTH

The human tendency to grasp the meaning of concepts by viewing them as systems of binary opposites is well supported in the scientific literature. It will come up again in Chapter 5. It also lies at the heart of the second of our inaccurate and destructive misconceptions of story.

Binary theory (Anderson 1993; Egan 1997; Paley 1990, 1984; Crossley 2000; Levi-Strauss 1978) suggests that humans intellectually set up a paradigm of binary opposites to understand new terms. You understand one word by comparing it to its opposite.

''Hot'' takes on meaning when compared to ''cold.'' Once these anchors are understood, we fill in the range between with warm, cool, tepid, or frigid. Black takes on meaning when contrasted to white. Only then can we meaningfully fill in the range between with shades of gray.

It was natural for humans to try to understand *story* by comparing it to its binary opposite, *non-story*. But English doesn't provide a separate vocabulary word for non-story. Certainly we have no agreed upon definition for non-story, and thus have no way to compare the two terms or to discuss the range of possible narrative forms that lie between these extremes.

In order to understand and create meaning for the word *story* and for this story–non-story binary system, humans subconsciously link story–non-story with other binary opposites related to communications that humans *did* and *do* understand: fiction versus nonfiction; truth versus non-truth (lies); real versus unreal; fact versus fiction. Thus, story was—at an unconscious level—associated with fiction, with make-believe, with unreality, and with the opposite of fact. Non-story lined with truth, with fact, with reality, with nonfiction.

Up to age seven or eight, most children think of stories as real (factual) and as unchangeable as histories (Applebee 1978). Just as children switch at some point from believing that Santa Claus is real to believing that he is unreal, so, too, they shift their core image of stories from truth to fiction (Applebee 1978; Egan 1997).

No one thinks that *all* stories are or have to be fiction, or that stories *can't* be truthful. It's more of an unconscious overtone, acting like a stereotype to flavor and distort the outlook of many toward stories and to cloud their attitude toward the use of and reliance on stories. Freeman (2003) reported that Americans in his study equated fiction with false, made-up, lies, and stories. His study subjects equate reality with nonfiction, truth, and facts.

In conversations with teachers, students, parents, administrators, and executives over the past few years, I have often detected this misconception lurking deep in the underpinnings of people's outlooks and attitudes about stories. The use of stories to make a point is automatically suspect. (Why didn't he just tell us the facts? Is he trying to cover up something and put a positive spin on it?) Stories are automatically suspected of containing untruths—or half-truths—or at least serious exaggerations. Stories don't deliver reliable information and fact. An eight-year-old boy asked me if he could be excused from a storytelling game because ''my father says I should never tell stories.''

Story is *not* the information, the content. Story is a way of *structuring* information, a system of informational elements that most effectively create the essential context and relevance that engage receivers and enhance memory and the creation of meaning. The information contained in a story may be fact or fiction,

invented or carefully researched and validated. Story is the framework, not the content hung on that scaffolding. Don't let the Binary Association Myth cloud your view of the potential or versatility of stories.

THE CHILDHOOD MYTH

The primary role modern society has given to stories has exacerbated these misconceptions and created additional, equally destructive myths. Our exposure to story comes primarily as children and primarily through fiction stories designed to entertain. This has unwittingly added a new binary association into the story–non-story paradigm: child versus adult. Stories are for children. Non-stories (factual articles, essays, data, and information) are for adults.

Thus, many unconsciously assume that all stories look like children's stories. Stories *exaggerate* as do children's stories. As soon as a child grows old enough, they should set stories aside (just as they set aside imaginary friends and childhood toys) and move into the factual, truthful adult world of nonfiction and non-story.

After a presentation on the use of story structure for science outreach writing, a woman approached me and said that she loved my story concepts, *but* ''What am I supposed to *do*?'' When I asked her to explain, she said that she taught a graduate-level physics course in stellar mechanics (the mathematical version of the life of a star) at a local university. She said (and this is as close to her specific words as I could recall when I wrote it down ten minutes later), ''What do I *say* when I go into class on Monday, 'Once upon a time there was a cute little star named Bob'?''

I realized she was serious. No matter what I had said in the previous ninety minutes, her deep-seated image said that all stories must look like children's fiction stories. Information on the use of story structure for science communication meant nothing as long as that fundamental misconception controlled her belief systems.

Combine the interweaving tentacles of these myths and people routinely come to the conclusions that stories are for entertainment. Stories are fluff and are inappropriate for presenting hard fact. Stories are incompatible with the presentation of scientific information. You resort to stories if you have a weak case or if you're hiding the truth.

In 1984, I decided to drop out of science and become a storyteller. I assumed that science and story were incompatible. I couldn't do both, so I chose story. Twenty-three years later, I struggle to convince science organizations and agencies that this belief is *not* true and that science and story are completely compatible (as are history and story, music and story, organization management and story).

Certainly, I am not the only one to observe these mythic disconnects between the reality of story and the common perception of story. Denning (2001) says of his early attempts as a senior executive at the World Bank to weave his presentation material into story form:

> I quickly found that I was living in an age when storytelling was suspect. Scientists derided it. Philosophers threatened to censor it. Logicians had difficulty in depicting it. Management theorists generally ignored it. Academics equated storytelling with the world of wholly fictional myth and fable. The antagonism toward storytelling may have reached a peak in the twentieth century with the determined

effort to reduce all knowledge to analytical propositions, and ultimately physics or mathematics.

In world-class understatement, he adds, "I found that the resistance to rethinking the role of storytelling was considerable."

So, stories have been sidetracked into the kiddy corner and labeled, "just for fun." We believe that story is the opposite of logic, that stories aren't effective for conveying serious and important concepts. And without ever consciously pausing to consider either the veracity or implications of our assumptions, we set aside the most powerful communications and teaching tool available to humans and then idly wonder why our efforts to communicate and to teach concepts, ideas, beliefs, values, attitudes, and facts do not succeed.

These myths may explain some of our difficulty with articulating a specific definition for *story*. However, they offer few clues about what a story *is*.

THE DICTIONARY'S TURN: THE FINAL MYTH

When all else fails, let the dictionary, like the cavalry, gallop in at the last moment to save the day. I have checked half a dozen different dictionaries and all used virtually the same wording in their primary definition:

Story: n.: *a narrative account of a real or imagined event or events.*

Is that what you mean when you say *story*? Do you agree? Many researchers do.

- Blythe et al. (2004) define story as: "The narrative accounts of events and experiences, real or fictitious. They can be spoken or written, vary in length, and depict past, present, or future events."
- Dalkir and Wiseman (2004): "Story may be defined as the telling of a happening or a connected series of happenings, whether true or fictitious."
- Booth (1979): "An implied author, who may differ from the narrator, presents information about characters and events to a reader."
- Ricoeur (1984): "A story describes a sequence of actions and experiences done or undergone by a certain number of people, whether real or imaginary."

But does that definition match the reality of what our hearts and minds say a story is? Let's test it.

He went to the store.

There is a narrative account of a real or imagined event. Is that what you mean when you say, "Tell us a story!"? If your child had been given a homework assignment to write a story, would that single sentence meet your expectations? Does that sentence have the impact and meaning you expect of effective stories? Does it convince you? Have meaning for you? Would you pay $15.95 for that story at your local bookstore?

Probably not. Yet that sentence meets the dictionary's definition. Conclusion? The dictionary is wrong.

Okay. That statement may seem a bit far-fetched. It might be more accurate to say that the dictionary is defining the wrong thing with their definition of story.

Here is another dictionary definition. This one for plot:

Plot: n.: *The arrangement or ordering of the incidents in a story, play, novel, etc.*

Plot is the sequence of events. These dictionary definitions for story and plot are virtually synonymous. But plot is only one part of a story. Certainly, plot alone does not constitute a story. It won't help to make our test story longer by adding additional plot.

He walked down the street. He stepped up onto the sidewalk. He paused at the double doors and then pushed his way into the store. He walked slowly down an aisle and waved a nervous hello to the shop owner. He paused in front of the cans of cream corn and picked one up. He sighed and then put it back on the shelf and left.

Now it's longer. Now is it a story? It meets the dictionary's definition. Does it meet yours?

More importantly, was it satisfying? Do you care about this character and these events? Did it answer your basic questions? Did it give you a sense of completion, of resolution? No, of course not. But these are the qualities most people in my test audiences and workshops say they want and expect from a story.

''Telling what happened'' is akin to giving the plotting facts of an event. But, as Taylor (1996) adroitly noted, ''Facts, theories, and reason alone do not stand a chance against a story because facts and reason ultimately depend on story for context and relevance and meaning—and, thus, for their power. Objective data always require interpretation and perspective in order to yield fact. Those require story.'' Thus, for example, facts supporting the **theory** of evolution will never vanquish the **story** of creation.

To demonstrate, Taylor (1996) said, ''Argue either case [of two opposing positions] with facts, statistics, and charts and we will nod politely as we nod off to sleep. Argue either side of that case [government's role in solving poverty] with powerful stories of hungry children or freeloading welfare cheats and we will storm the barricades.'' No one ever marched on Washington because of the facts on a flowchart. Facts and plot alone do not a story make.

How can we resolve this apparent discrepancy? The dictionary is defining that all-encompassing, everything-is-a-story version of the word *story*. In that sense of story, virtually everything *is* a story and story is virtually synonymous with plot. A better way to view it is to say that there are many levels of story. ''I went to the store today but they were out of our favorite kind of spaghetti sauce,'' is a Level 1 story. It meets the all-inclusive dictionary definition but doesn't accomplish any of what we want our stories to accomplish.

If we view story—as we will in this book—in the narrower sense of what many would call a good story or an effective story—that is, the Top Level of story—and identify the elements and characteristics of these stories that create their success, then we will have unlocked the secret to effective communications and teaching through story.

The problem is one of vocabulary. A small irony: English, the largest language on Earth, has a remarkable dearth of vocabulary words to describe narrative structures of the language, itself. It is akin to the situation we would have if we had only one word to describe precipitation. Someone stumbles in from

outside and shakes off. You ask, ''What's going on out there?'' Dripping streams of water onto the floor she answers, ''Precipitation.''

It's laughable because we demand far more precision in that answer. We have easily fifty words to describe different velocities, densities, rates, volumes, and temperatures of precipitation. Good stories and effective stories *are* stories. The others are called stories only by default because we lack vocabulary labels to individually describe and define them.

Far more important than this conundrum of English vocabulary and narrative titles—although that does substantially add to the general confusion about what is and is not a story—is the underlying concept. Narratives are *not* all alike. Real and important differences exist between different types of narratives. Those narratives that I am calling stories possess specific characteristics that create their unique effectiveness—characteristics not shared by other narrative structures.

Literary critic Northrop Frye (1957) observed, ''We have no word for a work of prose other than 'story,' so story does duty for everything, and thereby loses its only real meaning as the name of a specific genre, or structure of narrative.'' We have lots of words for specific subcategories of story—tale, fable, myth, legend, fairy tale, folk tale, parable, por qua story, epic, snippet, humorous, tall tale, farce. We have no other word than story for the subcategories of narrative.

I have read scholarly articles in which the author used four versions of the word *story* (story, *story*, STORY, and ***STORY***!) to describe different narrative structures. She said that she did it because there were no commonly recognized words other than story for her to use and yet the point of her research and writing was to differentiate the characteristics and use of several different styles of story.

Fireman et al. (2003), in agreeing with Russell and Lucariello (1992), said, ''Some of the best minds in literary scholarship and in cognitive and developmental psychology have spent years attempting to get hold of the essential and distinguishing characteristics of narrative.'' Why has it been so hard to pin down the seemingly elusive definition of story? Certainly it has not been for lack of talent or effort. The names from narratology alone read like a who's who of narrative research—Levi-Strauss, Noam Chompsky, Vladimir Propp, Paul Ricoeur, Topdovor, Bremend, and Roland Barthes.

It's because they are trying to study and corral the all-inclusive dictionary story, not the effective story that has a specific set of definable common characteristics.

THE STORY STEP: WHAT IT MEANS TO US

Many want to jump straight to the research and find studies that support their desire to expand a reliance on stories. I provide this caution. Neither assess nor use the research until you have a clear and specific understanding of story. Misconceptions surround stories as densely and as thorn-filled as the enchanted thicket surrounded and hid Sleeping Beauty's castle. First, learn what the word *story* does and does not mean. Then you'll be equipped to evaluate and successfully use the research to support your own purposes.

We still don't have a working definition of story. I propose using a different approach. If stories are uniquely effective inside the human mind, then let's use recent advances in cognitive sciences, developmental psychology, and neural biology to understand the specifics of how the human mind processes,

understands, creates meaning from, and remembers incoming narrative information. We will then use the elements of that process as the foundation of our definition of story.

We must start at the very top and proceed into the world of gray goo that is the human brain and peer through the prism provided by the variety of neural and cognitive disciplines to construct an overall image of human mental processing. Bransford and Brown (2000) observed, ''What is currently most striking is the ways in which evidence from many different branches of science are beginning to converge.''

We will find that they inevitably converge on *STORY*!

CHAPTER 3

STARTING AT THE TOP: A NOD TO THE NOODLE

The evolutionarily created predisposition of human brains to story thinking is reinforced through the years of brain plasticity by a steady childhood diet of stories.

Ancient Egyptians thought so little of the brain that they made a practice of scooping it out through the nose and throwing it away before mummifying the body and placing ''important'' organs in elaborately decorated jars. Aristotle believed that consciousness resided in the heart, not in the head. In 1662, philosopher Henry Moore scoffed that the brain showed ''no more capacity for thought than a cake of suet or a bowl of curds'' (Pinker 2000).

How does this mound of gray Jell-O bring into being our understanding of a question or of another's action? How does it create our ability to answer or to act appropriately in response? Through what mystical and sublime process does electrochemical energy become hope, passion, fear, or understanding? The magic unfolding of the brain and mind will lead us at every turn directly to story.

WHAT'S IN THIS GRAY GOO?

Ball your hands into fists and hold them together, knuckles touching with thumbs on top and pinkie fingers on the bottom. That's about how big your brain is. No wires, sparks, batteries, or flashes. Just a wrinkly, soft-to-the-touch lump that is 85 percent water and weighs typically less than three pounds. But that glob of wobbly goo controls everything you do, everything you feel, everything you think, everything you dream and wish. Your brain faithfully performs thousands of functions every second that you are alive.

That typical brain contains 100 billion brain cells (100,000,000,000)—about the same as the number of stars in the Milky Way. That's also a million times more

brain cells than a fruit fly has and ten times as many as most monkeys. Each cell is linked by synapses to as many as 100,000 others. That means your brain has created over 500 trillion (500,000,000,000,000) wiggling string-like fibers called axons and dendrites that connect with other neurons at junctions called synapses. These synapses are awash with neurotransmitters and hormones that modulate the transmission of electrochemical signals. Synapses constantly form and dissolve, weakening and strengthening in response to new experiences.

The first brain cell, or neuron, is thought to have appeared in animals about 500 million years ago. The neuron marked a crucial leap in evolution, second only to that of the DNA molecule (Kotulak 1999).

A typical brain neuron receives input from thousands of other cells, some of which inhibit rather than encourage the neuron's firing. The neuron may, in turn, encourage or discourage firing by some of those same cells in complex positive and negative feedback loops. Somehow, through this freeway maze of links, loops, and electric traffic jams, we each manage to think, perceive, consider, imagine, remember, react, and respond.

Burdick (2006) reported on some interesting research by Dr. David Engleman, a neurobiologist at the University of Texas. Engleman's research has shown that the brain lives just a little bit in the past. A human brain collects a lot of information and then pauses for a moment to organize it before releasing the processed information to the conscious mind. "Now" actually happened a little while (several milliseconds) ago.

To demonstrate this to yourself, tap your finger on a tabletop at arm's length. Light travels faster than sound. So the sight actually reached you a few milliseconds before the sound. However, your brain synchronized the two to make them *seem* simultaneous. The same thing happens when you watch someone's lips move as they speak. During these microsecond pauses the brain/mind constructs a plausible story to make the incoming information make sense. Sensory impressions enter the brain; stories exit to the conscious mind for interpretation and action. A significant part of what the brain does for the conscious mind is structure experience into story.

Brains, however, come at a high cost. They require enormous amounts of energy, oxygen, protection, and thermal regulation. Plants don't need brains. They don't need to think about their environmental and personal conditions or consider alternative responses. They survive quite well relying on the molecular reflex level. Animals cannot survive as well as plants and so need brains.

If you'd like to read more about brain structure I recommend Pinker (2000), Kotulak (1999), Newquist (2004), Horgan (2004), or Kruglinski (2005).

WATCHING YOU THINK

Scientists have studied the brain only for the past few centuries. As late as the seventeenth century, scientists believed that thought and consciousness existed in the heart, lungs, liver, and even the stomach—anywhere but the brain. Even after the brain began to receive the credit it deserved, little progress was made in studying brain structure and function until the mid-twentieth century.

Now all of that has changed. The brain is no longer a mysterious black box. Medical science has created machines and research techniques that can watch individual neurons and synapses pulse merrily through their day. Cohen (1995) said, "Although the brain's operation is still far from completely understood,

technological advances in recent years have allowed scientists literally to see how the brain works in ways previously unimagined.''

In the past decade researchers have crafted arrays of thousands of electrodes, each of which can monitor a single brain cell (Horgan 2004). These arrays have shown that individual cells spike (respond) to specific images—and to no others—a familiar face or object for example. It might be that images are centered in single cells.

The new scientific and medical techniques used to peer into the inner workings of the brain now allow scientists to track real-time electrical activity, blood consumption, oxygen consumption, glucose consumption, metabolic activity, tiny shifts in brain shape, shifts in the way light is reflected off of the brain, color shifts as blood is drawn or released, and even changes in the density and movement of neurotransmitters. Scientists can now observe (and test) mental function at this minute level to confirm theories on brain and mind function. They can literally watch you think!

The UCLA's Neuro Imaging Lab alone holds over 90,000 brain scans by various technologies from 20,000 patients. With this vast database, they can detect and evaluate microscopic changes in neural activity.

Such tomography scans show that the brain's left side lights up in various spots when considering, reading, listening to, or forming language (but not with hums, sounds, or music). It's language that does it. (Pinker [2000] reported that the psychologist Ursula Bellugi has shown that, remarkably, the same parts of the brain fire when deaf people watch signers.)

A FEW RELEVANT PARTS OF THE BRAIN

What have these neural technologies revealed about the functions of different parts of the brain that affect language and story? It is increasingly clear that cognitive function cannot be pinned to spots on the brain like towns on a map. A given mental task may involve a complicated web of circuits that interact in varying degrees with others throughout the brain—not like parts of a machine, but like instruments in a symphony orchestra that combine their tenor, volume, and resonance to create a particular musical effect (Shreeve 2005).

Paul Broca (in 1861) was the first to prove that different parts of the brain have specific mental functions. Working with a man named ''Tan,'' Broca identified a small area of the brain (Broca's Area) that controls speech. In 1874, Carl Wernicke identified an area just behind Broca's that helps people understand language. Wernicke's area seems to have a role in looking up words and funneling them to other areas (notably Broca's) that assemble or dissect the sentence into blocks to construct meaning.

Pinker (2000) stated that ''a very gross anatomy of the language sub-organs within the perisylvian might be: front of the perisylvian (including Broca's area): grammatical processing; rear of the perisylvian (including Wernicke's and the three-lobe junction): the sound of words, especially nouns, and some aspects of their meaning.''

It is also interesting to note that the frontal lobes, which house the circuitry for decision making and conscious thought, are not directly connected to the brain areas that process raw sensory input. Instead, most of their input fibers carry what neuroscientists call ''highly processed'' input coming from regions one or more stops downstream from the first sensory areas (Crick and Koch 1995).

Unconscious portions of our human brains process raw sensory input and pass it to intermediate processing areas of the brain. These areas (also in the unconscious portion of our brains) are the exact areas that are activated when humans create stories (Pinker 2000; Newquist 2004; Kotulak 1999). The output of these regions is fed to the conscious mind for consideration. In other words, the brain converts raw experience into story form and then considers, ponders, remembers, and acts on the self-created story, not the actual input experience!

Edelman and Tononi (2000) concluded, ''These unconscious aspects of mental activity play a fundamental role in shaping and directing our conscious experience.''

BRAIN DEVELOPMENT

Shreeve (2005) provides a good summary of embryonic neural development. A human embryo doesn't just sit, being bored, and suck its thumb. It works overtime developing a brain. Four weeks after conception a human embryo produces half a million neurons every *minute*. Over several weeks those neurons migrate to the brain following genetic (evolutionary) cues to determine their specific destination. (We'll talk about those evolutionary cues in a minute.) During the first two trimesters, neurons begin to stretch tentacles out to each other, establishing synapses at the rate of two million a *second*! Three months before birth, a baby's brain has more neurons than at any other time in its life.

Just weeks before birth, cutthroat competition begins. Groups of neurons compete with each other like political parties before an election to recruit other neurons into their expanding network of specific functions. Those that lose die off in a Darwinian weeding process. Those that win survive as parts of functioning neural nets, already partly tuned to detect, receive, and comprehend the world in a particular way. By a baby's second day of life, all of its sensory organs function (vision develops last), soaking up information to speed to the developing brain. For the next eighteen months a baby's brain is a learning machine—learning for the sake and joy of learning—with no need for context or relevancy for the incoming information.

The question is: What evolutionary cues and predispositions direct this vast brain development? What neural nets survive the Darwinian competition?

The mass of humanity has learned to read and write only in the past few hundred years. Logical, expository, and argumentative forms first emerged perhaps 5,000 years ago. But humans have been telling stories for 100,000 years or more. Evolutionary biologists tell us that 100,000 years of story dominance in human interaction has rewired the human brain to be predisposed before birth to think in, make sense in, and create meaning from, stories. For more on this important concept see Nelson (2003), Donald (1991), Plotkin (1982), Tomasello (1995), Bruner (1990), or Pinker (2000).

Many researchers have studied the reactions and mental processes of babies. Their work has confirmed that, at birth, humans think in story terms. Bruner's (1990) long years of clinical studies have shown that we are born preprogrammed to search for, and to create meaning from, story elements. Others who have explored the link between babies' neural processing and story structure include Nelson (2003), Shreeve (2005), Newquist (2004), Pinker (1997, 2000), Tallal (1994), Bransford and Brown (2000), and Huttenlocher and Dabholkar (1997).

Gopnik et al. (1999) summed up thirty years of his own research and that of three other eminent developmental psychologists with, collectively, forty years

of clinical research experience. ''Our brains were designed by evolution to de-velop story representations from sensory input that accurately approximate real things and experiences in the world. Those programs . . . let us predict what the world will be like and so act on it effectively. They are nature's way of solving the problem of knowledge.'' Their research confirms that stories are a primary way that humans interpret the world around them.

Babies arrive predisposed to focus on characters and their behavior. At birth babies can discriminate human faces and voices from other sights and sounds (Gopnik et al. 1999). In the first few months of life—many months before they develop language—babies learn to evaluate, observe, understand, and emulate the details of human emotional behavior.

Let's summarize the brain's story-related development as reported in the research. At birth, babies know to link voice with face and to study facial expression and emotion (character traits). By one year, they understand sequen-tial actions and canonical (normally expected) behavior. They have mastered the general concepts of goals and motives. They have learned to look where others point, and to point where they want others to look. This implies that they understand wants (having you look at what they *want* you to look at) and to act (point) to satisfy those wants. It also implies that they understand that you think and process as they do so that they can expect you to respond to their action as they want you to.

By eighteen months babies understand desire, goals, conflict in the name of goal pursuit, and cause-and-effect sequencing and connections between events. By two years they become empathetic (character understanding) and under-stand ''trouble'' as a deviation from accepted or expected norms.

Just as their verbal skills are emerging, story structure is already firmly locked into their thinking. Gopnik concluded his research by saying, ''The baby's computers start out with a specific program for translating the inputs they get into accurate representations of the world and then into story-based predictions and actions'' (Gopnik et al. 1999).

Hardcastle (2003) reports on a series of research studies (especially Miller 1994 and Miller et al. 1990) to develop the idea that children in the two- to four-year-old range actively model and mimic parents' story structure from ''a brief assertion of an event to an adventure with a point and emotional representation.'' Young chil-dren automatically and naturally strive to learn and use story structure.

By the beginning of kindergarten, my own informal research shows that the concepts of story ''trouble,'' character, temporal sequencing, cause-and-effect sequencing, and goal are well fixed and known. Given a character and a goal, children will easily identify the type of trouble that is most likely to occur and will correctly identify that trouble will emerge to block a character from reach-ing the stated goal. Additionally, they *know* to search for hints of upcoming trouble. They know what to expect from a story and will adjust their percep-tions and their interpretations of narrative inputs to find (or create) it.

By age six, most children include the concept of threat to a main character in their stories (Applebee 1978). That is, they have mastered the concept of conflicts and danger as drivers for their story creations.

For additional discussions of this early development pattern, I suggest Gopnik et al. (1999), Bruner (1990), Pinker (2000), Bransford and Brown (2000), Nelson (2003), Donald (1991), Dunbar (1993), Kotulak (1999), or Huttenlocher and Dabholkar (1997).

CELLS THAT FIRE TOGETHER WIRE TOGETHER

Humans arrive depending on story scripts evolutionarily woven into the hardwiring of our brains. But Huttenlocher (1984), a University of Chicago neurobiologist, experimentally established the plasticity of childhood brains. Children's brains are capable of major rewiring and restructuring. But that plasticity is temporary. Like slowly hardening cement, the brain sets up and fixes its neural linkages and pathways. Huttenlocher showed that brain plasticity fades beginning at age seven or eight and is gone by age twelve or thirteen. ''If you want to significantly influence a child's ability to think and to acquire knowledge, the early childhood years are very critical'' (Huttenlocher 1984). Recent research indicates that adult brains remain more plastic than previously thought (Begley 2007) but are still far less plastic than are the brains of children.

So humans may *arrive* as story-dependent creatures, but does typical development during key plasticity years affect that neural wiring? The answer is, if anything, our use of, and dependence on, story during childhood years reinforce (and actually strengthen) the story wiring inside human minds.

Why does it happen? Partly because of the natural hardwiring that creates a story predisposition. Partly it is because that predisposition is reinforced throughout childhood by repeated reliance on story. Surveys show that the vast majority of parents read extensively, and read primarily stories, to their young children. This exposure reinforces and develops the dominance of story structure in the brain (Bransford and Brown, 1993).

Bransford and Stein (2003) stated, ''Experience builds structures of the mind by modifying structures of the brain.'' The steady diet of stories that children experience modifies the brain to render it *more* predisposed to think in story terms. Kotulak (1999) stated: ''Things that a child experiences become part of his mental architecture, laid down in the neural connections that are retained. Connections that are not reinforced by stimuli from the outside world are pruned away, dead branches that no longer flower.''

What does a child experience? Stories. Stories read, stories viewed, stories listened to, stories told by parents for entertainment and for information. Cliatt and Shaw (1988) stated, ''Children learn and internalize story structure from a diet of told and read stories.'' Nelson (2003) (supporting work by Donald 1991 and Dunbar 1993) observed, ''Infants and toddlers use story to explain and to create meaning because that's what parents and their culture do.''

Cells that fire together wire together—and strengthen their connections and their propensity to fire together at the next opportunity (Kotulak 1999). A steady diet of information, experience, and entertainment successfully interpreted in story form means that story-based neural nets are steadily strengthened, and that the likelihood of their continued use as an integrated whole increases, while the brain is malleable and plastic during childhood.

Johnson (1987) said, ''Our earliest encounter with explanation comes in the form of stories told to us by our parents. From the beginning of our language acquisition, we must learn how to construct our own story fragments in response to our parents' questioning of our actions. ('How did *that* happen?' 'What have you done?' 'Where are you going?')'' After researching young children's responses, he concluded, ''For children, to explain is to tell the right story that is appropriate to the situation, one that has a chance of successfully answering the questions put to them.''

Crossley (2000) (following earlier work by Langellier and Peterson 1996 and by McAdams 1993) said, ''We are inculcated from a very early age to seeing connections between events, people, and the world in a certain way through the stories told in our families.''

Bruner (1990) (and before him Fillmore in 1968 and 1977) stated that research clearly shows that a young child is early and profoundly sensitive to goals, motives, and the actions taken for their achievement (for example, ''all gone,'' ''uh-oh''). That is, they are sensitive to understanding events through story structure.

Because of this hardwiring and reinforcement, it's stories, not other narrative forms and structures that humans understand and use. As Bruner stated (1990), ''Children produce and comprehend stories long before they are capable of handling the most fundamental Piagetian logical proposition that can be put into linguistic form.'' We master stories first because they arrive already loaded into the childhood brain. Other forms of expository narrative, logic, and critical thinking must be taught and painstakingly learned.

Our species thinks, perceives, and acts according to story structure. The more we do it, the more likely we are to do it in the future and the greater is the predisposition for story thinking that we evolutionarily engineer into future generations. *That* is the story of human brains.

WHAT IT MEANS FOR US

Three key truths have emerged from recent neurological research.

1. One hundred thousand years of human reliance on story has evolutionarily rewired the human brain to be predisposed to think in story terms and to use story structure to create meaning and to make sense of events and others' actions.
2. Cells that fire together wire together. The more a child (or adult) engages their story neural net to interpret incoming sensory input, the more likely they are to do it in the future.
3. This evolutionary predisposition is reinforced by the dominant use of story throughout childhood. Children hear stories, see stories, have stories read to them, and read stories themselves. This dominance of story exposure through the key years of brain plasticity results in adults irrevocably hardwired to think in story terms.

This story tendency is certainly not a bad thing. In fact, it's a good thing—for you. It provides a ready, proven pathway into the core of human thinking. It is as if the brain, once understood, offers a roadmap to its internal processes. We call the core of that roadmap a story. To extend the metaphor, story is emerging as the interstate express carpool lane into the mind. Why? Just as traffic engineers designed those special lanes to speed traffic into major cities, so, too, evolution and the brain's experience during its plastic years have engineered story pathways as express routes into the human mind.

Why tell and teach stories as the basis for all language and writing development? Because they work better than other narrative forms. Why do they work so well? Because that is how human brains are wired to think. But to understand the true effect of that wiring, we must turn to the mind.

CHAPTER 4

NOGGIN KNOW-HOW: THE MIND *IS* WHAT THE BRAIN *DOES*

Seven guiding principles define the story information human minds require in order to understand, to make sense of, and to create meaning from incoming narrative and experiential information.

Brain is the hardware. Mind is the software. The mind is what you do with the amazing wiring that constitutes the neural net of your noggin. Minds compare new input to data (experiences, thoughts, interpretations) already stored in the brain, interpret and understand the new information, and create meaning from it.

Try this: Imagine a submarine. Imagine a group of people singing ''Happy Birthday.'' Imagine your neighbor. These are all images based on your remembered experiences. Now imagine the submarine painted yellow and your neighbor looking out a porthole of that yellow submarine as it floats through the air with a crowd of people standing on the deck singing ''Happy Birthday.''

This can't be based on experience. You created this image. You imagined it. And you likely imagined it as easily as (or even more easily than) you recalled your actual experiences. What magic does the mind do to create images as easily and vividly—as real—as real images from experience? How do chemicals, fibers, electrical impulses, blood, and gooey tissue create and then hold onto these images?

We will not explore all of the functions and processes of the mind. Our concern is with stories. But how the mind processes, interprets, and acts on incoming narrative information is the key to understanding the power of story.

The goal of the mind is to sift through the constant bombardment of inputs and interpret and evaluate each so that it can decide: Should I pay attention? If so, how does it relate to me? Within what context can I place this information? What does it mean to me? Should I remember it?

For our purposes, the key steps in this complex, speed-of-light neural process are:

1. **Interpretation and Evaluation**. As we saw in the last chapter, this happens before processed information is passed to the conscious mind for examination. This is where information is shaped into story. We need to see how the mind does that and what story form it naturally uses. If you shape your material into that specific story structure, then it will pass through to the conscious mind with few, if any, internal alterations, additions, and restructurings. *Your* story reaches the conscious mind, not some other story created by the receiver's own mind.
2. **Decision Making**. What criteria does the mind use to determine if incoming story information is worthy of receiving attention and being remembered?
3. **How does memory work?** How is information filed into memory? How is it recalled from memory? I'll separate this topic into its own chapter (Chapter 6).

Turner (1996) concluded, ''*Story* [emphasis added] is a basic principle of mind,'' and ''Most of our experience, our knowledge, and our thinking is organized as stories.'' Raw inputs—like lumps of Play-Doh—are shaped into story form before evaluation by the conscious mind. Because the mind uses hardwired, fixed templates (neural maps) to guide this construction process, the mind is willing to create any missing bits of key information in the raw input.

Why is it important to study the mind in order to understand narrative? Applebee's research (1978) concluded that any narrative ''is a product of the internal workings of the mind, and must reflect the complex processes of that mind more directly.'' Applebee (1978) and Holland (1978) both showed that each reader creates a unique reconstruction of the material that the text provides based on that person's internal story scripts. If we study the mind's activity, we will understand how to control the reconstruction each mind creates.

Much of this chapter is based on the work by a handful of giants in the fields of developmental psychology, evolutionary biology, neural biology, and cognitive sciences: Pinker, Bransford (see Bransford and Brown or Bransford and Stein), Bruner, Schank, Turner, Egan, Applebee, Anderson, Kotulak, Crossley, Lakoff and Johnson, and Fisher. I refer you to their excellent work for more general treatises on mental functioning. I have had to cull through the broader research by these scientists to locate the limited gems that pertain to the intersection of mind and story.

In the few years since the inception of cognitive sciences in the late 1970s, neural scientists have made many startling and fascinating discoveries. Lakoff and Johnson (1999) reported on research showing that most thought is unconscious, operating below the level of the conscious mind. As an example, during every second of a conversation you are:

- Accessing memories relevant to what is being said.
- Comprehending a stream of sound as language, and forming the sounds into words and sentences.
- Assigning a structure to the sentences in accordance to grammatical constructs.
- Assigning meaning to words and groups of words.
- Making semantic and pragmatic sense of the sentences as a whole.

- Framing what is said in terms relevant to the conversation and the speaker.
- Performing inferences relevant to what is being discussed.
- Evaluating the conversation flow in terms of your own goals and objectives for this conversation.
- Constructing mental images where relevant of conversation information.
- Filling in gaps in the discourse with stored experience and structural story maps.
- Noticing and interpreting body language and comparing this interpretation to your interpretation of the meaning of the language.
- Anticipating where the conversation is going.
- Planning what to say in response.

Most of this thought is unconscious. Partly because of these types of internal processings, most conversation is with yourself. You talk to yourself in story conversation far more than you talk to others. We humans seem to enjoy talking to ourselves and seem to process and digest mentally much better through internal conversation than through external conversation.

An example (this from Bickle 2003) of what such a conversation looks like:

I stare at my closet on Friday morning and my little inner voice commences: Paisley shirt or the canary one? Canary. That's what you feel like. But you gotta dress up on Monday. Canary shirt today means doing laundry this weekend. Paisley! But wait. Aren't you going to meet Sharon for a lunch meeting? Isn't she the one who joked about paisley before? Canary. No. Maybe I can use whatever snide jokes she makes to my own advantage. Paisley! Wait. Do I care if I irritate Sharon? Would I ever want to date her? No. Fine. Paisley it is.

That conversation would roar through your mind in a matter of seconds and would likely be complicated by a half dozen additional variables that your unconscious mind would stream into the story for comparison and evaluation. And that is just one of hundreds of such internal conversations we each employ every day. You typically will have 30 or 40 such internal conversations for every one you share with another person (Baars 1997).

As another example of the new insights that arrive annually, Kotulak (1999) reported on extensive research showing that ''the ability to form abstract thoughts is now seen as a consequence of the brain's learning to read.'' Abstract thought and reading wouldn't seem to be linked. However, cultures who do not read do not use abstract thought. Once they do learn to read, they are capable of, and use, abstract thought. Consider the following:

All bears in Yellowstone are black. Bernard is a bear in Yellowstone. What color is Bernard the Bear?

Easy. Right? Bernard is black. It's simple logic based on your ability to conduct abstract thought and deductive reasoning. However, when even the most intelligent members of nonliterate societies are asked, they can't answer. Typically they say, ''I have never been to Yellowstone and I have never met Bernard the Bear. How could I possibly know what color he is?'' (This phenomenon was also reported by Egan 1997, Bertelson and DeGelder 1988, and Scholes and Willis 1991.)

Perry (1995), a Baylor College of Medicine neuropsychiatrist, said, ''A thousand years ago in medieval England most people did not think abstractly. How

superstitious they were is not dissimilar from the way eight- and nine-year-old children today view the world.'' He also stated (and this encourages my hope to someday learn telepathy and teleportation), ''In the same way that we developed certain abstract cognitive capability as a function of our ability to read, there is every reason to believe that there are other untapped abstract capabilities of our brains that are not being developed by our traditional education system.''

No, the final chapter in the human mind owner's manual has certainly not yet been written. Luckily for us, those chapters that deal with processing narrative are far more concrete and proven.

OWNER'S MANUAL FOR THE HUMAN MIND: THE CONCEPTS THAT GOVERN THE MIND'S STORY MAP

Cognitive scientists have reached good agreement on how the mind processes incoming narrative or experiential information. The growing sophistication of neural net modeling has allowed neurobiologists and neuropsychologists to test assumptions about brain and mind function. Combined with improved medical imaging technology, scientists can build neural nets (computer and physical models), assess outcomes, observe human behaviors and mental functions, compare the two, and adjust the models' operation to accurately mimic human mental function (Pinker 1997).

As I have read this research, I have been struck by a relatively few simple principles that scientist after scientist describes as the governing concepts that direct how human minds accomplish this task. I have identified seven of these principles in my reading and, being a Western buff as a kid in the 1950s and 1960s, instantly named them The Magnificent Seven. The names are mine. The concepts are regularly described in the literature.

Supporting these concepts, scientists describe a series of more specific mental techniques (tools) that minds use in order to apply these concepts to incoming information. I found eleven of them and so named this mental model ''The 7-Eleven Approach'' to understanding how your mind makes sense of the world. (See technique #6 to see why this name is so easy for you to remember.)

The 7-Eleven stores are no longer open only from 7 A.M. to 11 P.M. as they once were. Most are open twenty-four hours a day. Thus, the 7-Eleven store is an always-available source of needed energy and sugar rush snacks. The term *7-Eleven* also stands for the human mind's always-available system for processing incoming narrative information.

These Magnificent Seven concepts and their empowering specific techniques describe a more accurate image of what the mind thinks a story is and create a rational foundation for us to use in building a more succinct and meaningful definition of *story*.

What does it look like when the mind uses these concepts to process narrative information? Here are three sentences:

He went to the store.
Fred died.
Sharon went hungry and wept.

After describing these guiding mental concepts, I'll show you how you used them to interpret those three sentences. But first several questions to whet your appetite.

Did you assume that the ''he'' in sentence #1 is Fred? Did you try to connect the first two sentences and wonder if Fred died because he went to the store or while at the store? Did you presume that Fred went to the store to get something for Sharon to eat? Did you assume that Fred and Sharon were connected and that she wept in part because Fred died? Did you deduce that the store Fred went to was a grocery store?

These are all signs of the Magnificent Seven Concepts at work.

The Magnificent Seven are:

1. Play It Again, Sam
2. Order in the Court
3. Get My Meanin'?
4. Intent Drives the Car
5. Mad about What's Missing
6. Every Story Is *Somebody's* Story
7. Such a Struggle

Play It Again, Sam: What Worked Before Will Work Again

Experience builds expectation. As Bransford and Brown (2000) put it, ''Experience builds structures of the mind [neural maps] by modifying physical structures [synapse connections] of the brain.'' Neurons and circuits that fire together wire together so that they will always fire together in the future. If using story maps to interpret experience and narrative input worked before, we assume it will work again and automatically engage those same sets of neural circuits to process the next batch of incoming information.

In Pinker's (1997) words, ''The mind is a system of organs of computation, designed by natural selection to efficiently solve the kinds of problems our ancestors faced.'' What successfully solved problems for past generations becomes hardwired into future generations as automatic mental functions.

Respected neural net modeler J. Anderson (1993) has noted the necessity to strengthen the likelihood of using a specific pathway each time that pathway is used. He has needed to incorporate that concept into his computer models in order to accurately mimic the functioning of actual human minds. The more you use it, the more you rely on it.

Bruner (2003) observed, ''Why do we use story as the form for telling about what happens in life and in our own lives? Because, most often, life follows story form and format. We use it because it usually works. Because it usually works, we have learned to rely on it as our primary mental model.''

Crossley (2000) showed through her research and writing that ''for the most part it is 'normal' for us to experience things as stories because, for the most part, things do, after all, make sense and hang together in story sequences.''

This human tendency for story is further reinforced by a powerful feedback loop. Bruner (2003) stated, ''We cling to narrative models of reality and use them to shape our everyday experiences. . . . Stories, including fictional narratives, give shape to things in the real world and often bestow on them a title to reality.'' Because we each view our past experience and lives in story terms, viewing new experiences and narratives in story terms ''fits'' better with our banks of previous experience and makes the new experience seem real and meaningful. We continue to rely on mental story structures to interpret and

understand events because we have relied on them in the past. We assume that mental story maps that worked before will surely work again.

Order in the Court

We assume that all parts of a narrative or event are connected, and that we can—and must—impose order and common structure on new narrative information and sequential experience. Another way of saying this is: We require that *It Makes Sense*. We'll create (mentally invent) what we have to create to make it make sense by using such mental tools as cause-and-effect sequencing, temporal sequencing, centering around a common theme, character analysis, etc. If we can't detect that some order exists in a narrative, we tend to discount and ignore the source material.

Bransford and Brown (2000) stated, "Particularly important is the finding that the mind imposes structure on the information available from experience and interprets (creates meaning for) experience through this story structure." Crossley (2000) called story "the organizing principle for human action," and she said that "humans always seek to use story structure to impose order and organization on the flow of experience."

Anderson (1993) used computer neural net models at Carnegie Mellon University to show that "cognitive skills are realized by production rules that forcibly impose order on sensory inputs." He concluded that "this is one of the most astounding and important discoveries in psychology and may provide a base around which to come to a general understanding of human cognition."

Readers construct a mental representation of a situation and actions that seems rational and reasonable and then use this mental model to interpret and evaluate later statements in the text. Readers tend to remember the mental model they constructed from a text, rather than the text itself (Bower and Morrow 1990, Johnson-Laird 1983, Sanford and Garrod 1981).

Close (2000), said, "Our minds have to explain irregularities . . . in story terms." We need for narrative information to appear orderly and understandable and will invent such story-based information as needed in order to explain any apparent irregularities.

Examples of this mental ordering and connecting abound. You do it every time you read new information. The three sentences I offered near the beginning of this chapter are an example. Crossley (2000) has shown that "if you present three pictures or sentences to a person, they will automatically connect them together to form a story, an account that ascribes motives and goals to the elements presented and that relates the provided images or pictures in some patterned way."

Any three sentences or pictures will do. As an example, here are three new ones.

> *John quietly locked the door and pressed his back against it as he leered at the children in the room.*
> *The ship's horn blasted three times as the last line was cast off the forward bollard and the gap between ship and dock began to grow.*
> *A glowing full moon, harsh as a spotlight, made him blink as he crept from the shadows into its merciless gaze.*

Three random sentences. There is no connection. But don't you naturally *want* to connect them, to make them fit together? Why was John leering? What's on the

ship that relates to John and the children? Them? The children's protector? Who stepped out into the moonlight? Was he hiding? From whom? Why did he creep? Your mind naturally wants to impose order and linkage on any narrative.

Get My Meanin'?

Patrick Henry might have said, ''Give me meaning, or ...'' Well, there is no ''or.'' Human minds demand meaning. To accommodate that demand, we assume that narrative *always* has meaning and that all of the information fits together to reveal that meaning. We are willing to create what we need to create in order to obtain the meaning of a narrative or situation. If we see no meaning, we ignore the narrative.

Why is meaning so centrally important? Johnson's research concluded that ''every one of us is actively plotting our lives, both consciously and unconsciously, by attempting to construct ourselves as significant characters within what we regard as meaningful life stories. As soon as people secure the most meager existence, they begin to worry about the meaning, value, and purpose of their lives'' (Johnson 1999). We demand meaning from narratives because we seek it as a primary goal in our lives.

When we listen to a melody we do not consider individual notes as isolated elements. Rather, each note is understood as part of a sequence as a whole. Each note takes on meaning only in relation to the note that has preceded it and in anticipation of that which will succeed it. Human minds do the same thing with narrative. But instead of using melody to impose meaning, we use mental story templates (maps). Individual experiences only assume meaning within the context of a time-based, sequenced story.

Miller and Johnson-Laird (1986) studied strategies for pursuing meaning and concluded that humans use story structure to fabricate meaning from narratives and experiences. Hardcastle (2003) concluded from her study, ''From the beginning, children try to understand the world and self as meaning something by creating stories with plot and temporal sequence.'' Sperber and Wilson (1982) concluded, ''We characteristically assume that what somebody says *must* make sense, and we will, when in doubt about what sense it makes, search for or invent an interpretation to give it sense.''

In his multidecade study of the concept of meaning, Bruner (1990) showed that story elements are prelinguistic and are relied on from birth to extract meaning from the events and actions of others. He also concluded that ''stories achieve their meanings by explicating deviations from the ordinary in a comprehensible form.''

We think we understand normal behavior and have predetermined its meaning. So we tend to pay no attention to such expected behavior and narrative. However, we need story structure to explain deviations from those expected norms and to extract appropriate meaning from those deviations. To accomplish this monumental mental juggling feat, we use mental tools such as assumptions, implications, inferences, and presuppositions.

What does this search for meaning look like in action? Here is a two-line conversation:

Person 1: ''Where's Jack?''

Person 2: ''Well ... I didn't want to have to tell you. But I saw a yellow VW parked in front of Susan's.''

Those two sentences introduce four characters: Persons #1 and #2, Jack, and Susan. Read the sentences twice and you will typically begin to construct relationships between these four people and histories to those relationships in order to ascribe meaning to the event presented in the two quotes. Jack could have gone to Carol's to study and his mother, Person #1, doesn't want him to get good grades and go to college. Carol's may be a restaurant and Jack has gone there to break his diet. The relationships you envisioned are your own fabrication, created by your own mind just to satisfy your own demand for meaning.

We assume it makes sense first, and figure out how to create or find that meaning second.

Intent Drives the Car

We assume that what characters do and what they say—how they act—are the result of, and a reflection of, the characters' intent. Intent is made up of *goal* (what a character wants) and *motive* (why the goal is important to them). Both goal and motive are representations of the character's beliefs and values. Intentions dictate and control behavior. Behavior reveals those goals, beliefs, and values. Intent steers and the body follows.

- Johnson (1999) stated, ''The myriad acts we perform each day ... are done for some purpose or other. Most of the time we pursue these purposes with little or no conscious reflection or awareness. Still, we constantly direct our energies toward realizing goals.''
- Bower and Morrow (1990) observed, ''Readers assume automatically that a goal is viewed as causing actions that, in turn, lead to outcomes.''
- Bruner (1990) stated, ''People have beliefs and desires. Actions are based on these desires and are logical attempts to fulfill desires.''
- Neurophysicist R. Montague (2006) noted, ''Remarkably, the single property that all biological and mechanical computational systems require is goals.''
- Pinker (1997) agreed that beliefs and goals drive behavior. But Pinker went further, showing that, if we are to truly understand behavior, we must first understand beliefs and goals.

An example: Sally smells smoke and leaves the building. Those are actions. But a correct interpretation of the meaning of those actions depends on understanding her goals and motives. We can't see into another's mind and have to make decisions based on available partial information. So we use ''rules of thumb,'' stereotypes, and other techniques to fill in a ''most probable'' goal to explain the behavior we see.

Sally left because she believes that smoke means danger and she wants to be safe. Right? Maybe. But maybe she left because she set the fire and wants to vamoose before she's caught. Maybe she left because she is a known pyromaniac and fears arrest even though she didn't set it. Maybe, though it is only the smoke from her roommate's pipe, she has a morbid fear of being burned, panicked, and fled.

The same actions can have radically different meanings depending on the goals and motives of the actor. Typically, however, we assume the most common, expected motive.

Pinker (1997) said it most succinctly. ''Our minds explain human behavior by their beliefs and desires because experience shows that people's behavior, in

fact, *is* driven by their beliefs and desires. We learn their beliefs and goals by studying people's behavior.''

A classic example of how dependent we are on goal in order to interpret and explain action was first created by Heider and Simmel (1964) and again by Michotte (1963). Both created a movie. Here is the plot: A protagonist strives to attain a goal. An antagonist interferes. Thanks to a helper, the protagonist finally succeeds. This movie, however, stars three dots. One dot moves some distance up an inclined line, back down, and up again, almost reaching the top. Another abruptly collides with it, and the first dot moves back down. A third gently touches our ''main character'' and moves together with it to the top of the incline.

Viewers see only the motion of these three dots. Still, all observers—*all* (and this test has been given to three-year-olds and up)—see the first dot as *trying* to reach the top, the second as *hindering* it, and the third as *helping* it to reach its goal. Actions have no meaning without goals and motives.

This human goal dependency starts early. Bruner (1990) and Fillmore (1968 and 1977) clearly showed that a young child is early and profoundly sensitive to goals, motives, and their achievement (for example, ''all gone,'' ''uh-oh''). Research with twelve-month-olds shows that babies interpret cartoons of moving dots as if the dots were seeking goals with purpose and intent (Pinker 1997).

Further, this dependence on goal and intent is universal. Pinker (1997) stated, ''Contrary to widespread belief that cultures can vary arbitrarily and without limit, surveys of the ethnographic literature show that the peoples of the world share an astonishingly detailed universal psychology.'' He went on to show that character and goal were central to the core stories of every known culture.

Science can't even describe the actions of a *gene* without assuming goal and motive. In his book *The Selfish Gene* (2006) Dawkins's central thesis is that genes *achieve their goal* by the way they build human brains to enjoy life, health, sex, friends, relationships, and struggles.

Bransford and Stein (1993) showed that specified goals define a story and define the appropriate actions and events that are relevant to that story. Consider the impact of knowing a character's goal on your ability to create meaning and to remember. Read this list of seven simple sentences (Bransford and Stein 1993) once and try to remember them:

The fat one bought the padlock.
The skinny one purchased the scissors.
The toothless one plugged in the cord.
The barefoot one climbed the steps.
The bald one cut out the coupon.
The kind one opened the milk.
The poor one entered the museum.

Cover the list. Do you remember which one purchased scissors? Which cut out a coupon? Which one climbed steps? Which bought a padlock? Probably not. Now reread the sentences with the addition of a stated or strongly implied goal for each.

The fat one bought the padlock to place on the refrigerator door.
The skinny one purchased the scissors to use when taking in her pants.
The toothless one plugged in the cord to the food blender.

The barefoot one climbed the steps leading to the vat of grapes.
The bald one cut out the coupon for a hair restoration clinic.
The kind one opened the milk to give to a hungry child.
The poor one entered the museum to find shelter from the snowstorm.

Easier to remember? Of course. Because goal creates relevance and meaning for an action. Also notice that, with the addition of a goal, your mind tends to create a vivid picture of the scene and (usually) to extend the scene forward and backward through time into a complete story. That is the effect of story intent.

Here is another example of the power of goal on readers (Bransford and Stein 1993). Read this paragraph:

Sally let loose a team of gophers. The plan backfired when a dog chased them away. She then threw a party but the guests failed to bring their motorcycles. Furthermore, her stereo system was not loud enough. Sally spent the next day looking for a ''Peeping Tom'' but was unable to find one in the Yellow Pages. Obscene phone calls gave her some hope until the number was changed. It was the installation of a blinking neon light across the street that finally did the trick. Sally framed the ad from the classified section and now has it hanging on her wall.

Confusing, isn't it? Note, however, that this is a plot, a series of actions or events. It is also frustrating and meaningless. Plot alone cannot convey meaning. However, if I add Sally's goal and motive, you will easily make sense out of it.

Sally hates the woman who moved in next door (motive) *and wants to drive her out* (goal).

Now reread the paragraph and see if your mind doesn't conjure images and sequences that make sense to you. Goal and motive provide structure, purpose, and organization to a narrative. Intent lies at the core of human narrative understanding.

Mad about What's Missing

Incomplete is good enough for human minds. Incomplete is not only good enough, it is the expected norm and is even preferred by human minds. Our minds are *designed* to work with partial information and fill in the missing information to arrive at understanding (Pinker 2000).

When a Pleistocene-era enraged wooly mammoth burst through the trees or a horde of spear-wielding strangers jogged into your clearing, there was no time to gather a complete understanding. Was the mammoth running toward something or away from something? Was it aiming toward you or arching off toward the path to your left? Did the squad of newcomers want to chat or to kill? Were they friend or foe?

There was no time to gather complete information and make an informed decision about appropriate action. He who hesitates is lost—and in these cases usually dead. Human minds developed the ability to make instant decisions by combining partial information with rules of thumb, with assumptions, with normal expectations, and with mental story maps. Working with incomplete information became our standard operating procedure.

Neural researchers say that this constant flow of partial information creates constant ambiguities. We use an iterative process where assumptions are made

that result in calculations that are used to check and correct the assumptions and reduce future ambiguity (Pinker 1997).

Possible combinations of meanings based on these assumptions are pre-coded and pre-connected in the brain before cognitive processing. Only the possible meanings that are consistent with our assumptions and neural models and maps are allowed in for cognitive consideration. That is, we only initially consider meanings and interpretations that we *expected* to find, that we are *predisposed* to find. We instantly assess based on preconceived stereotypes and other base cues.

The other six concepts I describe in this chapter are, in fact, rules of thumb created to deal efficiently with incomplete narrative and experiential information. We don't need to quiz a dozen spear-wielding strangers about their individual intentions. We glance at their face and body posture and use character-based story assumptions and stereotypes to quickly decide—stay or run.

Our system of filling in around incomplete information with what we most expect is the basis of countless visual tricks and illusions. It is the foundation of magic. You see what you expect to see and are fooled every time by what you didn't see because you never expected it and so never looked for or observed it.

We *assume* that walls and floors are rectangles meeting at right angles and so fall prey to carnival ''shrinking room'' illusions. We *expect* that, when a magician shuffles a deck of cards, that the cards will change order in the deck. We *expect* that, when a magician says he's picking up the top card on a deck, and when it looks like he's doing what we'd do to pick up the top card, that, in fact, he has. Presto! We're amazed when it's not and give credit to the magician rather than blame our own sets of assumptions for dealing with incomplete information.

Another visual example is the oft-used Kanizsa triangle (Zeki 1993, 263). This picture is a geometric diagram of solid bars, shaded rectangles, lines, and angles. A triangular-shaped void in the middle is only partially outlined and defined by the places where this space intersects and seems to overlay the bars, shaded areas, and lines. Still, all viewers ''see'' the triangle that isn't there because we are used to working with incomplete information and filling in to make the entire image make the best possible sense.

The same concept applies to narrative information. We assume cause-and-effect relationships and we assume that actions are designed to achieve goals. We assume rational character behavior. We use our neural story maps to define what we expect based on even the scantiest information we are actually given. Why? Because these assumptions normally work and because they allow us to make instant decisions without waiting to gather more complete information.

Consider Goldilocks. The story never says why she ventured into the bears' house. She heads for the kitchen and eats. So we guess that she must have been hungry (as opposed to her being a compulsive glutton). She pokes around a bit, so we assume she's a curious kid (as opposed to a thief casing the premises). She wanders upstairs to take a nap, so we assume she must be tired.

These are all assumptions we come to after the fact based on what she does. Upon careful review, none of these makes much sense—especially since she is traipsing through a house where one swipe from any paw of any resident could kill her. Still, we launch happily into the story without knowing her intent because we don't mind working with incomplete information and believe that we'll figure it out soon enough.

Incomplete information may be fine with the receiving mind, but it is a bane for the writer or speaker. Each mind will fill in with its own version of goals, motives, values, beliefs, attitudes, cause-and-effect relationships, etc. That is, each mind will create and remember its own meaning from your material, not your intended meaning. The more carefully you deliver the core information a receiving mind needs, the less creative work that mind is forced to do, and the more likely it is that your actual messages are received, considered, and remembered.

Every Story Is *Somebody's* Story

It seems obvious. Amazingly, most ignore it when preparing informative articles, essays, textbooks, and presentations. It may be the information you want to communicate, but it is the story characters that make it relevant, meaningful, and compelling (worth remembering) to readers and listeners. We don't understand events, actions, narratives, without viewing them from the perspective of a character.

Olmstead analyzed over a thousand successful articles, essays, and short stories and found that each focused on character, intent, and emotional state to create meaning from events. "Too often we are taught that essays are about ideas. They are discussed in terms of logic, argument, theory, and delivery. Yes, essays are about ideas, but the writer is telling the story of that idea and stories are told through characters" (Olmstead 1997).

Try it. Imagine any favorite movie. Now remove the characters. Describe the events without reference to the characters. Did you lose the meaning? Did it make sense? Now describe everything you know about the characters, their goals and motives, their attitudes and characteristics, and the conflicts/problems and risk/danger they must face. Easier? More interesting? Character is central to your understanding of narrative.

Writers and storytellers have long known this fundamental truth.

- Syd Lieberman (2005), a leading American storyteller and an author of several story collections: "It is the human effort that fascinates, excites, and empowers. Put a human face on the effort."
- John Gardner (1978), novelist: "The first thing that makes a reader read a book is the characters. The more memorable the characters, the more memorable the novel."
- El-Youssef (2006), a Palestinian author and journalist: "A novel (story) has opened people's minds and awareness as my fact-based essays and articles never did and never could."
- Steven King (2000) begins each book by envisioning a stressful situation. He then looks at each character present and marches backward through their lives to see who they are and how they got into this situation. Story, for King, is about the characters.

Researchers have come to the same conclusion. Rule and Wheeler (1993) studied writing elements that produced reader interest and concluded, "A story is about people. About people in trouble or conflict. Caring about the main character makes readers care about the story."

In his book on myth and mythic writing, Frey (2000) devotes an entire chapter entitled "What It's All about Is WHO." That chapter is just on the main character. He presents a separate whole chapter on the antagonist (The Evil One)

and the interaction of these two pivotal positions. Character is the focus of story.

Taylor (1996) spent considerable time establishing the notion that we literally *need* to watch characters face and make decisions and that these decisions—in order to have any significance to the reader—require a goal that is important to the character.

''Whether a story is believable depends on the believability and reliability of character'' (Fisher 1987). Readers make this decision by applying the Magnificent Seven concepts to assess a character's decisions and actions and deciding what values, motives, and intents those actions represent. Readers view actions (plot) to understand character (not the other way around). Beyond mere believability, Bower and Morrow (1990) showed that readers attribute competence and noble motives to the character with whom they identify, especially when that character faces significant conflicts and obstacles.

Supporting the concept of *Mad about What's Missing*, Fisher (1987) showed that readers search actions to determine character values and then assess the character by comparing those values against their version of known archetypes (town marshal, knight-errant, schoolmarm, greedy banker, etc.). Again, the value of narrative actions is that they help readers evaluate characters.

In a 1986 experiment, Bruner read story passages to subjects and recorded the subjects as they retold the story. Subject story versions were universally character-based renditions of the story (not plot-based) and often dealt more heavily in character feeling, thinking, and internal emotions than did the original. (''They each converted the story into a tale of character—character and circumstance'' [Bruner 1986].) Plus, many of these ''tell backs'' added themselves as a character in their telling, including their experience of hearing the story as a source of viewpoint and perspective for their listeners.

This focus on character as the central organizing concept for narrative understanding begins early in life. While studying London school children, Applebee (1978) concluded that children grasp that stories don't have to be about real *things* long (a year or more) before they accept that the *characters* in those fictional stories might also be fictional.

Similarly, Egan (1997) showed that story abstractions (in Peter Rabbit, for example) are meaningful to young children when the children can base their understanding on the motives, intentions, hopes, and fears of characters that seem familiar and real to children. *Somebody* has to venture into the bears' house and dig herself into deeper and deeper trouble as she gobbles breakfast and smashes furniture so that readers can see the dangers of excessive spontaneous curiosity. It doesn't have to be Goldilocks. It could be anyone. But it has to be a specific someone.

Not only do we demand that characters exist in narratives so that we have a viewpoint through which to assess and evaluate story information and events, we demand to know enough about these characters to be able to assess them as a way to evaluate events and information. Narrative writing is all about character.

Such a Struggle

Readers search for meaning not through successes and achievements, but through conflict and struggle. Conflict is energy. It is tension. Conflict is the

engine that drives excitement in a story. But it is the struggles of a character against these conflicts and problems that reveal meaning to readers. Lyon (2003) observed, ''The universality of human suffering and struggle compels your reader—a stranger—to invest in your story.''

Bransford and Stein (1993) showed that ''a suitable story problem exists when there is a discrepancy between the initial state and a desired goal state, and when there is no ready-made solution for the problem solver.''

The key there is the ''no ready-made solution'' part. It is easy to demonstrate.

Mary desperately wanted—needed—some ice cream. So she walked into the kitchen and got some. The End.

It's just wrong. It's not worth telling, hearing, or remembering. Such a story is even offensive to many. It violates some core tenet of narrative structure. We need it to be hard for Mary. We need for there to be no ready-made way for her to get her ice cream and we need her to exert great effort and to face risk and danger en route to her ice cream. We need her to struggle so that we will find meaning and value through her struggle.

We don't care about Mary, her ice cream, or her story until she struggles. Struggle unlocks the key to successful story structure. You may want to communicate accomplishments and achievements, but it is the character's struggles to get there that give those accomplishments any meaning or relevance to the reader, that give them meaning and value.

Zaltman (2003) reported on a study using an illustration of two running monsters in a long, receding tunnel (originally drawn by Roger Shepard in 1990). Both monsters are actually identical in every detail. One is placed in the foreground, the other in the background—apparently farther back in the tunnel. The second monster *seems* to be bigger because the perspective lines of the tunnel make it appear to fill the tunnel. In the study, people viewed the illustration for four seconds. All viewers then reported seeing a large monster with an *angry* expression chasing a smaller one with a *frightened* expression who was trying to get away. Even after people were told and shown that the monsters were identical, they still viewed the two monsters in the same way, insisting that one looked angry and the other looked frightened. They still insisted that one was struggling to escape and that one was struggling to catch. The illustration made no sense without character purpose based on implied struggle. Study researchers concluded that essential story emotions and elements were more powerful than facts. We need to see characters struggle to obtain or do something that is important to them.

Children writers I work with habitually want life to be easy for the characters they create. They tend to give their main characters super powers and then find that they have no story to tell that isn't boring for readers. Why? Life is too easy for the character with the most power. So we only appreciate the king when he seems racked by woes and wistfully wonders ''what the simple folk do.'' Even the lordly king has to struggle if we readers are to care.

Think of the Lone Ranger. He sits in his hotel room polishing tarnish off of his silver bullets when he hears a cry, ''The bank's being robbed!'' In a flash our beloved ranger has strapped on his gun belt and donned his mask and jangling spurs. He races down the stairs and out onto the dust-blown street to find hunched-over, eighty-eight-year-old Swedley Scramblebrain shuffling out of the

bank tapping his white-tipped cane on the wood-plank sidewalk muttering, ''Ha! I stole a penny! I stole a penny!''

The Lone Ranger snatches Swedley up under one arm, hustles him to jail, and locks him up. Case closed!

And we readers are totally dissatisfied. *Anybody* could have made that arrest. In fact, our sympathies run with poor, blind Swedley and we're angry with our hero for not showing a bit of compassion.

What's wrong? No struggle for the Lone Ranger. The Lone Ranger only earns our respect and admiration when he struggles. We are only on his side and care about his issues and concerns when he struggles to reach them. We want Swedley to be backed by a gang of twenty ex-NFL thugs armed with rifles, shotguns, pistols, and knives and carrying double bandoliers of ammunition. We want Swedley to have stolen $100,000—the entire savings of everyone in town. We want the Lone Ranger to have been captured, rolled up in barbed wire, and tossed onto the train tracks with the ''2:10 to Yuma'' express train only sixty seconds away and barreling down the tracks. And we want the Lone Ranger's only available weapon to be a small pocket comb with two teeth missing.

Now we care. Now we'll root for the Lone Ranger. Why? Now he has to struggle, facing grave risk and danger to get free, arrest Swedley, and save the town. How characters deal with problems as they try to reach goals will remind readers/listeners of their own struggles and goals. It creates context and relevance for story information.

THE MAGNIFICENT SEVEN IN ACTION

Let's return to our three-sentence demo and see how these concepts lead you toward creating meaning from three random sentences. The sentences were:

He went to the store.
Fred died.
Sharon went hungry and wept.

1. You assume that there must be some organization, order, and connection between the three sentences and search for possible sequencing that will provide clues as to what that connection is.
2. With no obvious linkage between sentences, you activate your neural story map to create enough information to garner meaning and to understand the narrative. Why? Because it has worked well for you in the past. If, on the other hand, you decide that these sentences are pointless and meaningless, you discount and ignore the narrative. People often do that when they aren't given sufficient story information with the data and technical information.
3. You don't mind that you are given grossly insufficient information in these three sentences. Incomplete is good enough. You are willing to create the missing elements and you assess what information you need.
4. You assume that the story is about Fred and Sharon (it has to be *some-body's* story) and assume that ''he'' in sentence #1 must be Fred—even though English grammar rules tell you that ''he'' refers not to the following noun, ''Fred,'' but to some unknown masculine noun listed somewhere above.

5. You impose a relationship to your characters in order to create story order. You assume that Fred and Sharon are somehow linked and that Fred's actions (going to the store) and Sharon's actions (weeping and going hungry) are also connected.

6. You assume cause-and-effect sequencing in order to impose story structure on this narrative information. You figure that Fred went to the store *and then* died and that because he died and never got back from the store, Sharon wept and went hungry.

7. Having created a general story structure, you search for intent. (Actions are always the results of goals.) Why did Fred go to the store? What did he want to do or buy? Why did Sharon weep? What was Fred to her?

8. You seek struggle in order to make sense of the story. Did Fred die *because* he went to the store? Was it too far for his weak heart? Did he try to carry too much back? Does Sharon now have to deal with the heartbreak of the loss of a loved one?

9. If your conscious mind is interested in what you have created so far and it sees meaning and relevance in this story creation, you will typically try to flesh out the characters and invent character traits for Fred and Sharon that make them seem real and believable.

The Magnificent Seven have spun straw into gold and handed you the core elements of a plausible story complete with meaning and relevance. Human minds use these concepts as guides to create stories to feed to the conscious mind out of virtually every narrative and experiential event.

WHAT IT MEANS FOR US

Human minds use a specific story structure to impose order onto incoming narrative and experiential information. These seven concepts represent the themes by which the mind accomplishes this amazing feat. Story creators and users need not only to be aware of these concepts, they need to accommodate and support them by giving readers what they need in order to deliver the original message, meaning, and intent to the conscious mind.

Review your narrative creations not just for content accuracy and completeness, but also for story completeness. Have you presented sufficient information about the characters in your narrative (real or imagined)? Do we clearly see their intent? Do we see their struggles? If the story elements draw a reader in, the content information will be relevant and worthy of being remembered.

CHAPTER 5

MIND MECHANICS

The goal of the mental gymnastics we perform on incoming information is to create context and relevance for the conscious mind.

Chapter 4 concepts lay the foundations for how the mind processes narrative information in its effort to create meaning, context, and relevance for the conscious mind. There are a series of specific techniques reported in the research that the mind uses to enforce these concepts on incoming information. These techniques further reveal the key pieces of information the mind seeks (or creates) for every narrative. We will use these core bits of narrative information to develop a more coherent definition of story in Chapter 7.

These techniques are employed at the automatic, subconscious level. Our minds rarely notice when we employ them individually or (more commonly) in combination to complete the wondrous mental gymnastics required by the conscious mind. We only notice their combined output, the results of their activity and of the story maps they use.

ELEVEN MENTAL TOOLS

I have identified eleven of these mental tools from the research. Seven concepts; eleven techniques—hence the 7-Eleven approach to how we humans processing narrative information:

1. Assumptions
2. Cheat Sheets
3. Expectations
4. Inference
5. Pattern Matching
6. Prior Knowledge

7. Binary Opposition
8. Blending
9. Language and Syntax Rules
10. Emotions Rule
11. Details

Eleven techniques is a lot to wade through when part of you wants to jump straight to a better definition of story and then assess the research. But your time here will be well rewarded in an improved understanding of the elements that give stories their power and effectiveness and that will form the core of our definition.

Assumptions

I used the word *assume* many times in the last chapter describing how human minds employ the Magnificent Seven concepts. We make myriad mental assumptions and then treat them as reliable truth to ease and speed the processing of new experiences. We take relationships and propositions for granted without mandating supporting evidence. That's an assumption.

Here's a quick demonstration of our tendency to make assumptions. Consider these two sentences:

John felt lonely. He rang the neighbor's doorbell.

1. We assume, and try to forcibly construct, a logical linkage between the two sentences.
2. We assume that John wanted company (a goal) and that he believed that company would relieve his feeling of loneliness (a motive).
3. We assume that he went next door and rang the bell in order to achieve that goal (an action to achieve his goal).
4. We assume that he wanted someone to answer.

We make instant assumptions based on what we consider to be normal behavior to fill gaps in the information required by our story neural maps. They aren't necessarily true. We simply assume they are until new information proves otherwise. The person next door might be an elderly, invalid man. When John feels lonely, he might turn mean and have decided to harass the neighbor for a laugh by making him struggle out of bed. The two sentences might not relate at all. We only assume that they do. John's job might be to ring doorbells and that action may not affect his feeling of loneliness in any way. Without more information, it's all assumptions—assumptions we are always willing to make in order to complete our neural story map.

Here are a few of the major narrative and experiential assumptions we make. These may all seem commonsense and reasonable. But they are just assumptions.

Each of the Magnificent Seven mental concepts is backed by an enabling mental assumption. We assume that the concepts are accurate and valid. Key among these activating assumptions are:

- **Written or told narratives always make sense.** As Sperber and Wilson (1982) said, ''We characteristically assume that what somebody says *must* make sense, and we will, when in doubt, search for or invent an interpretation of the utterance to give it sense.''

- **All actions are designed to achieve goals.**
- **The parts of a narrative always connect and have an organizing order.**

Other key assumptions include:

- **Everyone thinks as I do.** We assume that all rational humans process information in the same manner and base their thinking on the same underlying principles that govern our own thinking. They don't consciously think our thoughts, share our values, and draw our same conclusions. But they are the same in that they base actions on their intent, use the same general concepts to supply their conscious thinking, use their own values and beliefs to govern their thought processes, and draw conclusions and meanings based on others' behavior.
- **What people actually say is new and important.** Through his studies of how people interpret and respond to narratives, Bruner (1990) concluded, ''What one *does not* utter is assumed to be presupposed or given. What one *does* utter is assumed to be new'' (emphasis added). For example, it would not normally make sense for someone to say, ''This room has walls.'' That is automatically assumed, a given—unless this were new and uncommon information when, for example, you were in a tropical island village where the huts are commonly built without walls.

   In this way, we judge everything a character says to be (in their view) new and significant information that will reveal character and provide key story information to the reader.
- **People act rationally according to accepted norms.** We assume that people act pretty much the way we do. School children learn these behavioral rules beginning in kindergarten (for example, keep your hands to yourself; wait your turn; don't interrupt; don't hit). Deviations from these extensive and detailed cultural norms require explanation. Without explanation, we assume these behaviors represent serious character flaws or are the result of some antisocial goal.

   We have, as a culture, taken this concept of normative behavior so far that it also applies to defining alien intelligence. Science fiction author David Alexander Smith (who created the first definition of alien intelligence) said that, in order for an alien to be perceived as intelligent, ''You have to be able to observe the alien's behavior and say, 'I don't understand the rules by which the alien makes its decisions, but the alien is apparently acting rationally by some set of rules''' (Smith 1982).
- **People agree on appropriate setting-specific norms of behavior.** Bruner (1990) said, ''We take for granted that people behave in a manner appropriate to the setting in which they find themselves.'' In the library, they will act library. At a square dance they'll act square dance. At work they'll act office. When people act in accordance with these situational norms, their behavior is taken for granted, needs no further explanation, and merits no further attention.
- **Temporal sequencing is appropriate and reliable.** We assume that it is appropriate and valuable to organize events according to temporal sequence. Clandinin and Connelly (2000) observed, ''We take for granted that locating things in time is the correct way to think about them.'' Ricoeur (1984) concluded that ''plot is events placed in time sequence with cause and effect links established.'' However, this is, at its core, an assumption.

Some Arabic tribal cultures believe that things simply happen according to the will of Allah and that temporal or other sequencing is irrelevant.

- **Past explains the present and predicts the future.** This assumption is a subset of temporal sequencing. It is the justification for temporal sequencing. This assumption allows us to convert temporally sequenced events into meaning and into predictions of future events.
- **A person's face reveals their beliefs, values, attitudes, and emotions.** Lakoff and Johnson (2003) said, ''In our culture, we look at a person's face—rather than his posture or movements—to get our basic information about what a person is like.'' We assume that facial expressions are unrehearsed and not consciously controlled and thus project a character's true reactions and feelings.

    When you detect a discrepancy between *what* someone says and *the way* they say it—their facial expression and vocal tone—you will always believe the expression and discount the words. *Always*. If someone curled their lips, rolled their eyes, and sneered, ''Oh, don't you look nice today,'' you would never feel complimented even though the words were a compliment. We believe the expression.

- **Cause-and-effect sequencing defines how things really happen.** Again from Lakoff and Johnson (2003): ''Causation is one of the concepts most often used by people to organize their physical and cultural realities.'' Infants first learn cause-and-effect relationships when they learn that they can directly manipulate objects around them—pull off their blanket, throw their bottle, drop their spoon (Piaget 1956).

Our willingness to make, and to rely on, assumptions keeps our minds from getting stuck in information gaps, endlessly spinning our mental gears searching for something that doesn't exist.

Cheat Sheets

Neural researchers call them cheat sheets or neural maps. Narratological and educational researchers call them neural schema, or just schema. The closest fit for ordinary folk is ''rules of thumb.''

Pinker (1997) described them this way. ''We mortals have to make fallible guesses from fragmentary information. Each of our mental modules solves this unsolvable conundrum by a leap of faith about how the world works. We use prefabricated mental cheat sheets to guide the making of indispensable assumptions—the only defense for which being that the assumptions worked well enough in the world of our ancestors.''

These neural cheat sheets take a few bits of fragmentary incoming information (for example, a sound, a glimpse, a tone of voice, a quick scan of a new situation) and, in two grand leaps, provide the mind enough information to make rational decisions. First, cheat sheets identify the additional bits of information that the mind will need. How do they know? Cheat sheets are accumulated banks of experience. They are lists of what was needed and what was successfully used in the past.

Second, cheat sheets activate banks of prior knowledge to identify the ''best guess'' for each missing bit of information. It is an amazing magic trick. Cheat sheets spin a few incoming signals into entire scenarios complete with character profiles, intents, dangers, possible actions, and likely outcomes.

As Lakoff's and Johnson's (2003) research showed, this neural mapping is not an abstract, metaphoric process. It is a physical process that creates real synaptic

structures (neural circuitry linkages and neural clusters called nodes) in the brain. Each successful use of a cheat sheet gives that neural map impetus to recruit new neurons into its net, to strengthen its linkages, to increase the likelihood of its use in the future.

Cheat sheets serve a second purpose. Pinker (1997) reported on neural biology findings that the brain can process only limited amounts of information at any one time. So instead of taking the time to compute complete theorems, the mind relies on crude rules of thumb and cheat sheets to speed processing. Cheat sheets are a mental efficiency device.

Bruner (1986) described cheat sheets this way: ''As our readers read, as they begin to construct a virtual text of their own, it is as if they were embarking on a journey without maps—and yet they possess a stock of maps that might fit this journey, or might give hints, and besides, they know a lot about journeys and a lot about map making.'' He also said that humans' primary vehicles for processing incoming narrative or experiential information are our neural story maps (Bruner 1986).

Schank (1990) went so far as to conclude, ''Scripts replace thinking. The thinking people do is to decide which script to apply.'' Later he said that humans automatically select story scripts to understand narrative and experiential information.

Stereotypes are a good example of a cheat sheet element. Character cheat sheets assume that the more an individual resembles a stereotype, the more likely he is to belong to that category and will exhibit the full set of stereotypical behaviors and beliefs for that category. When *Gunsmoke's* Marshal Dillon sees a stranger wearing a black shirt, he becomes suspicious. If that stranger also sports a black hat and twin, pearl-handled .45s, he fits the *Gunsmoke* stereotype for a bad guy and the good marshal took action without waiting for proof positive.

Combining the research of many researchers here are the assumptions most often cited as being part of human's story cheat sheet or neural map. (See Pinker 1997, Bruner 1990, Lakoff and Johnson 2003, Schank 1990, Johnson 1996, Fisher 1987, Cooper 1997, and Polkinghorne 1988.)

- **Time.** We organize events chronologically and assume that this will reveal order, connectedness, meaning. (Things don't ''just happen.'')
- **Cause and effect.** We assume that events in the past cause events in the present and that present events will cause events in the future.
- **Goals.** Goals, beliefs, and motive exist for all characters and for all of their actions.
- **Characters act.** All characters act to fulfill their goals and desires. Characters' actions reveal their beliefs and desires.
- **Goal driven.** All actions are driven by beliefs and goals. Actions are designed to achieve goals in a manner consistent with beliefs.
- **Only needed actions.** Characters only act to fulfill goals they have not yet achieved and then only act if they believe an action is required to achieve a goal.
- **Future actions.** A character's future actions can be predicted by knowing their past actions and their beliefs and desires.

Consider this paragraph from Cooper (1997) as an example of neural cheat sheets in action.

Andrew was having a great time at his party. He was playing games and opening presents. When it came time to blow out the candles on the cake, he blew and blew but they would not go out. As soon as he thought he had blown out the candles, they would light again.

Notice that, even though events and actions are never explained, you have no trouble following, picturing, and understanding them. From the opening sentences, we assume this is a birthday party. The provided information fits with prior experiential knowledge our party cheat sheets dredge out of memory about birthday parties. From these same banks of knowledge, we know about cake and candle birthday rituals. From the last two sentences, our story maps fill in character emotions, motives, goals, beliefs, and probable ages. We can imagine who put the trick candles on the cake and why. We know why Andrew tried so diligently to blow out the candles. We imagine all other party goers laughing, know why they laughed and how they felt. We can fill in the entire sequence of a typical party and know that ice cream is nearby even though not mentioned.

However, individuals from a culture that did not put candles on a cake to represent age, or that did not have trick candles, or that did not give presents to the birthday celebrant, would be totally lost and unable to understand this paragraph since their story maps could not overlay these events into their expected norms of behavior and activity.

Both Polkinghorne (1988) and Culler (1981) offered the following to demonstrate the central role of cause and effect in our story maps.

The king died. The queen died.

These sentences trigger neither temporal sequencing nor cause-and-effect linkage and so do not activate story maps. They are received merely as facts.

The king died and then the queen died.

Here we have temporal sequencing but no hint of cause and effect. Mild curiosity might arise about a linkage between the two deaths or even about their effect on the population and country. But story maps are not yet activated.

The king died and then the queen died from laughing too hard.

This version includes cause-and-effect linkage. Now your story maps can be activated and you no longer accept the statement as a simple fact. You begin to wonder about the character and personality of the king and queen and about their relationship. (Did she laugh so hard *because* her husband died? Is *that* how she really felt about him? Had he banned laughter from the kingdom while he lived and now she was at last free to indulge?) You begin to make assumptions about character beliefs, desires, and past actions. These wonderings and assumptions are signals that your neural story map has been activated and is trying to locate or create the essential information to expand this fragment of information as a complete story. That's what cheat sheets do.

Cheat sheets are powerful, efficient, and are standard operating procedure for human minds. But they also limit the range of information readers seek and consider. Once you understand this human reliance on neural story maps and learn their key elements, you can consistently provide the essential elements that control how readers select and apply cheat sheets to use with your narrative.

Expectations

We expect things to be as we expect them to be. Bruner (1990), a leading researcher in this field, said, ''We take for granted that people behave in a

manner appropriate to the setting in which they find themselves.'' We have fixed expectations for places, events, people, and behavior.

Bruner (1986) said,

> Our central nervous system seems to have evolved in a way that specializes our senses to deal differently with expected and with unexpected versions of the world. Unexpected versions (unexpected in that they violate the neural maps or ''models of the world'' stored in the brain) most often alert the cerebral cortex through discharges of impulses in the so-called ascending reticular system, a tangled skein of fibers that runs in parallel with orderly sensory nerves, both working their way upstream to the upper brain.

When events, environments, people, or situations match our expectations, we take little if any note of them. Our sensory system blocks them from reaching our conscious mind. It cuts down on the clutter the mind must process and consider. Any exception to expectations, however, is flagged for full attention.

A man with only one arm draws stares. Why? We expect humans to have two even though we know it is possible to have only one. A person with three arms would draw more attention since that would violate both expectation and our full range of plausibility. Our expectations control our attention. Again from Bruner (1986), ''The more unexpected the information, the more processing space and time it is given. . . . It means that perception is . . . an instrument of the world as we have constructed it in our expectations.''

These exceptions to the ordinary must be explained. Such explanations, concluded Bruner (1990),

> . . . will always take the form of a story and include reasons (intention, motive, viewpoints) to make the extraordinary make sense and, within its own context, seem ordinary. . . . All such stories seem to be designed to give the exceptional behavior meaning in a manner that implicates both the intentional state of the protagonist (a belief or desire) and some canonical element in the culture. *The function of the story is to find an intentional state that mitigates or at least makes comprehensible a deviation from a canonical cultural pattern.*

Expectations and surprise are tightly linked. Bruner (1986) showed that ''surprise is a response to a violated presupposition.'' In his 2003 book, Bruner revisited this concept and concluded that ''story making is our medium for coming to terms with the surprises and oddities of the human condition. Stories provide context and structure to render the unexpected less surprising and more understandable.''

Bruner (1990) reported that research shows that very young children focus on the effort to establish and record canonical behavior (expected normative behavior) and to explain deviations from this expected norm. For example, infants perk up, stop sucking pacifiers, stare longer, or look surprised when something happens that they did not expect. Expectations begin at birth and define our view of the world.

As an example of how expectations direct our attention through a story, consider this shipping record:

> A three-masted sailing ship, the *Fair Wind*, sailed on September 13, 1849, from Halifax, Nova Scotia, with a complement of forty-eight sailors and a full load of lumber. It never reached San Francisco, California, its destination.

There is no real interest for readers here. All provided information falls within the range of our normal expectations. Change the cargo to include the final treasure trove of Captain Kidd, who hid it along the coast of Canada before he was hanged. This is of slightly greater interest because it is less expected but still seems reasonable. Change the cargo again to 300 women being shipped around to California as mail-order brides in the California gold fields. Now it's surprising—even startling. Why? It violates all of your expectations.

The ship sailed uneventfully. No interest there. Change it so that the ship vanished in a blink less than one-quarter of a mile from the San Francisco docks as over 500 people stood and watched. Again, this is interesting because it violates your expectations.

In both cases, you require some explanations. You want to know the story in order to make sense out of this violation of your expectations. Breaking expectations creates interest, but also requires explanation.

Inference

We regularly infer one thing based on how we interpret another. *Infer* suggests the arriving at a decision or opinion by reasoning from known facts or evidence. You begin with your banks of prior knowledge and then consciously infer from them to some new situation. Inference differs from assumption in that an assumption is taken for granted and not necessarily based on reasoning and logical deduction.

Inferences allow us to create connections within a narrative by consciously associating information in the story domain with our blocks of prior knowledge in order to make reasoned predictions. Crossley (2000) said, ''When we ask, 'What does this mean?' we are asking how something is related or connected to something or someone else. It is the connections or relationships (real or inferred) among events that constitute their meaning.'' Inferences allow readers to increase their number of relevant connections to a text and thus increase its personal meaning.

Lakoff and Johnson (2003) have conducted extensive research on the concept of information transfer from one mental domain to another. They concluded, ''Do we systematically use inference patterns from one conceptual domain to reason about another conceptual domain? The empirically established answer is absolutely 'yes.'''

You see a black rock against a field of white snow and glance up to see if there is a small, dark cloud that could be shading the rock. Seeing a clear blue sky, you infer even lighting across the entire field and conclude that the rock is, in fact, black.

Bruner (1986) went to extensive lengths to demonstrate that readers use inference and presupposition (all based on past experience and existing scripts) to make sense out of narrative. Consider this now familiar example:

> Person 1: ''Where's Jack?''
> Person 2: ''Well ... I didn't want to have to tell you. But I saw a yellow VW parked in front of Susan's.''

To make sense of this passage, you study person #2's line and make two inferences that form the foundation of whatever relationships and scenario you imagine to explain the situation. First, you infer that Person #2's reluctance to

speak means that the presence of a yellow VW outside Susan's will be interpreted as bad news by person #1. Second, you infer that the location of the yellow VW reveals (or at least strongly implies) Jack's location. With these two reasoned inferences in hand, you are free to make additional assumptions that explain the relationships and complete your quest to create plausible meaning.

Pattern Matching

Anderson (1993) studied mental function by building and adjusting computer neural nets to match the production of human minds. He determined that pattern matching is a key ''reality check'' by the mind and defined the term this way: ''Pattern matching refers to the process of determining if a production's conditions (narrative input or the result of some mental assessment) match the contents of working memory.''

The mind constructs a story domain (image of the place, events, situations, and characters) based on provided information and then compares this domain to other real and fictional domains stored in memory. Readers and listeners will not accept the new story domain if it seems to violate established physics, rules, expectations, and plausibility without suitable explanation. Typically, readers react to such violations by being pulled out of the story.

If, in a story, an eight-year-old boy walked unchallenged onto a top-secret, heavily guarded research lab, most readers would react by saying, ''No way! He couldn't do that.'' Those readers are pulled out of the story and, worse, tend to automatically discount other story information.

In some versions of an American folk tale, Lazy Jack (sometimes titled, ''Obedient Jack''), Jack's mother beats him each time he comes home. It pulled me out of the story. It seemed wrong to me. The only way I could match her behavior to any known pattern was to say that she was an abusive mother and I should call child protective services. But that's not what the story is supposed to be about. It's supposed to be a funny, upbeat story. In order to tell the story, I had to change her behavior to match patterns that were acceptable to me for a loving and supportive (although certainly frustrated) mother.

Familiarity with, and greater experience with, the patterns and form of story make it easier to read and understand information in story form. Cooper (1997) studied this and concluded, ''Students generally have more difficulty reading expository texts than story texts because they have had less experience with them and because these texts tend not to follow clear-cut, established patterns.''

The common structural patterns of a story (even if unconscious) are fixed and established in every person's mind. Using this pattern enhances meaning by increasing the number of inferential connections that readers can make by matching new story domains into existing story patterns.

Prior Knowledge

Cooper (1997), consistent with other researchers, defines it this way: ''Prior knowledge is the sum of a person's previous learning and development and the experiences that precede a learning situation, story, etc.''

There are two general types of prior knowledge: topical and structural. Topical prior knowledge includes all of the banks of information we each have stored in memory about specific topics, characters, situations, places, events, and experiences. It's everthing you have learned and know from the value of π

to fifteen decimal places to how to bake a soufflé to the address of the houses you used to live in.

Structural prior knowledge refers to knowledge of the structures we use to convey information from lists to movies, to songs, to all forms of narrative. Pinker (2000), Cooper (1997), Bransford and Stein (1993), Durkin (1981), and many others concur that knowledge of story architecture is the most used of all of these structural banks.

We employ topical prior knowledge to identify plausible meaning from poorly worded or unclear sentences.

Dr. Tackett gave a talk on the moon.

We know, topically, that there are no humans on the moon. So grammatically we now know that ''on'' means not location but ''about.''

Cooper (1997), Anderson and Pearson (1984), Adams and Bertram (1980), Barr et al. (1991) have all clearly stated that research over the past two decades has established that the process of constructing meaning through reading, writing, speaking, and listening is based on the prior knowledge that individuals bring to the situation.

Here is an example (this from Bransford and Stein 1993) of the extent to which previous knowledge affects your ability to create meaning from, and remember, text. Consider the following sentences:

John walked on the roof.
Bill picked up the eggs.
Pete hid the ax.
Jim flew the kite.
Frank built the boat.
Harvey flipped the electric switch.
Ted wrote the play.

Before you read any further, cover the sentences and see how many you can remember. Who build the boat? Who flew the kite? You understand the sentences, but have no context or relevance for them and so you don't remember them.

Now let's shift only the character identity to invoke culturally available prior knowledge to aid you in creating meaning and memory. I will change only the *names* of the seven people.

Santa Clause walked on the roof.
The Easter Bunny picked up the eggs.
George Washington hid the ax.
Benjamin Franklin flew the kite.
Noah built the boat.
Thomas Edison flipped the electric switch.
William Shakespeare wrote the play.

You probably laughed when you read this revised list. Of course you can remember these seven sentences. You already knew each one. And that's the point. As soon as a sentence linked to banks of your prior knowledge, it became relevant to you and you had a context within which to understand and remember it.

Here is another example (from Bransford and Stein 1993) of how we humans use topical and structural prior knowledge to create meaning.

A thirsty ant went to the river. He was carried away by the rush of the stream and was about to drown. A dove, sitting in a tree overhanging the water, plucked a leaf and let it fall. The leaf fell into the stream close to the ant and the ant climbed onto it. The ant floated safely to the bank. Shortly after, a bird catcher came and laid a trap in the tree. The ant bit and stung him on the foot. In pain, the bird catcher threw down his trap. The noise made the dove fly away.

Here is how most humans put prior knowledge to work in that paragraph. First we activate topical (biological and environmental) knowledge. You know that the ant walked to the river and the dove flew to the tree. You know that a tree is tall with sturdy branches that could support the dove. You understand that the ant could drown (in contrast to a fish) and that the dove plucked the leaf with its beak. You know that gravity made the leaf fall and that leaves will float.

Once you understand the biology and ecology of the event, you activate story structural knowledge in the form of neural story maps and try to fill in missing information to create meaning. Most people assume that the dove plucked the leaf on purpose to save the ant, that the bird catcher planned to capture the dove, and that the ant bit the bird catcher to repay the dove. You create goals for each character and cause-and-effect relationships between events to create meaning.

Now compare your easy interpretation of that paragraph with this one (also from Bransford and Stein 1993)

Pete argued that data gathered from a NASA voyage to Venus called into question current theories about the formation of our solar system. Part of his talk emphasized the importance of mass spectrometers. He then discussed the isotopes of argon 36 and argon 38 and noted that they were of higher density than expected. He also cited the high values of neon found in the atmosphere. He has a paper that is already written, but he was aware of the need for further investigation as well.

Most people struggle to understand, and to create meaning from, this paragraph. Why? There are no banks of topical prior knowledge to use to understand the basic relationships and statements. Because no character information (for example, goals, reactions, or feelings) is given, you can't use story structure to gain insight into unfamiliar topical areas.

Interestingly, I have used this example paragraph at NASA workshops. There, everyone had huge banks of prior topical knowledge. They not only understood the information, but tried to figure out which satellite was being referenced and who Pete must be and what papers he would have written on the topic. They were quite disappointed when I admitted that, as best I knew, Pete was a fictional character and the paragraph was created by a developmental psychologist in 1993 for demonstration purposes.

Prior knowledge is a central key to understanding and to the creation of meaning. It will have a prominent presence in Chapter 9 as we review research that links story to comprehension and to memory. The more banks of prior knowledge activated by an incoming narrative, the greater the reader involvement and relevance. When the topic (subject) of a narrative is unfamiliar, familiar story structure becomes a valuable form of prior knowledge to activate in order to guide the reader toward creating meaning and memory.

Binary Opposition

The concept of binary opposition was mentioned back in Chapter 2. It will come up again in Chapter 9 when I present research results. Of all researchers, Egan (1997) and Levi-Strauss (1978) have most thoroughly analyzed binary opposition.

Egan (1997) showed that all concepts, situations, and characters are first presented in binary terms such as hot/cold, big/little, rich/poor, tall/short, clever/dumb, patient/impatient, beautiful/ugly, culture/nature, public/private, active/passive, and obedient/disobedient. Forming binary oppositions is a primary tool in our sense-making ability.

His research showed that young children (by the age of four) understand abstract concepts (for example, freedom/oppression, security/fear, knowledge/ignorance, or independence/disobedience) when placed in binary opposition within the context of stories (Peter Rabbit, Hansel and Gretel, Pinocchio, Star Wars). However, they are unable to understand them through logic argument or rote memorization (Egan 1997).

Paley (1990, 1984) showed how children use binary opposition and story structure to make sense of their experiences. Levi-Strauss (1978) thoroughly demonstrated that binary structure is basic to all myths and that the exposure to such a structure is the key to their proper interpretation. Polkinghorne (1988) showed that meaning comes from constructing opposing relationships among things such as same as (or not), similar to (or not), an instance of (or not), stands for (or not), part of (or not), and caused by (or not).

Egan (1997) developed the idea that human understanding comes from developing binary opposites and then creating terms that mediate the space between these two extremes. Thus, hot and cold establish a space within which we can understand temperature. But the understanding comes through terms that mediate between the binary opposites (warm, cool, tepid, scalding, freezing). The concept even applies to binary opposites that are discrete and have no mediating categories (for example, animal/human). Humans then tend to spin fantasy story worlds wherein the technique of mediation can play unconfined by reality to produce mythic half-human, half-beasts.

Binary opposition is also the basis for our understanding of abstract concepts (good/evil, fair/unfair, loyalty/selfishness). ''If abstractions like oppression, resentment, justice, fairness, revenge, revolt, and their relationships, were not in place by age four, the typical child would be unable to understand the story of Robin Hood, Cinderella, Sleeping Beauty, or even Peter Rabbit'' (Egan 1997).

Binary opposition is an essential tool of meaning. New concepts (both concrete and abstract) are more readily understood when presented in binary opposition. Egan (1997), Levi-Strauss (1978), Paley (1984 and 1990), Polkinghorne (1988), Crossley (2000), and others have shown that story structure enhances presentation of, and understanding of, binary opposites.

Blending

Blending is the process of overlaying one set of mental knowledge or images (called a domain) onto another. You hear someone talk about his struggle to get to work through the snow and, in your mind, you overlay your own experiences on top of his to create meaning by comparing the two. Parable, proverb, metaphor, analogy, and simile are all forms of blending. Some researchers call this

process *projection*. Information from one mental domain is projected onto another to create new meaning.

While entire books have been devoted to this one mental technique and to its importance for creating meaning, Lakoff and Johnson (1999 and 2003—focusing on the power of metaphor) and Turner (1996—focusing on parable) have devoted more analytical effort to studying the blending process than any other researchers. Johnson (1999) showed that ''our most important moral concepts (e.g.: will, action, purpose, duties, rights, laws) are defined by systems of metaphors,'' and that ''we understand morally problematic situations via conventional metaphorical mappings.''

While middle school students view metaphor as a new and arduous grammatical form they must master, Egan (1997) and Winner (1988) demonstrated that, by age three, children clearly understand metaphors that refer to real-life situations. ''Seeing is believing,'' stems from the ''Knowing is seeing'' metaphor and starts literally: ''See Daddy come in.'' ''See the mess I made.'' Seeing occurs simultaneously with knowing. From there it advances to ''See what I mean?'' and ''I see your point'' (Johnson 1999).

''Affection is warmth,'' is another example of a literally based story metaphor that develops during early childhood, built from the experience of being held (affection) and the warmth of physical contact with another human body. Thus, a metaphoric association is made because both sets of neurons fire together: physical sense of warmth and feeling of affection. It grows into ''He's a warm person''; ''She's cold''; and ''She's like ice today'' (Lakoff and Johnson 1999).

Egan (1997) provided extensive empirical data to support the conclusion that very young children use metaphor easily, frequently, and naturally. He also presented data to support the claim that children understand story and metaphor by age three; logic and reason between the ages of ten and twelve.

Parable and Proverb

Turner, a well-regarded cognitive scientist and neuroscientist, focused on the use of parable as a mental blending tool. He concluded, ''Parable is the root of the human mind—the root of thinking, knowing, acting, creating, and plausibly even speaking'' (Turner 1996).

In the same 1996 book, Turner said, ''*Story* is a basic principle of mind'' and ''Most of our experience, our knowledge, and our thinking is organized as stories.'' He reconciled these two seemingly inconsistent statements by saying, ''The mental scope of a story is magnified by *projection*. One story helps us make sense of (create meaning from) another. The projection of one story onto another is *parable*, a basic cognitive principle that shows up everywhere, from simple actions . . . to complex literary creations like Milton's Paradise Lost'' (emphasis added) (Turner 1996).

A **parable** is a short story of familiar characters, things, and events that have hidden symbolic meaning through an allegorical relationship, an analogy with a moral or religious lesson. The parable of the Good Samaritan is a well-known example. As you hear the story, you activate your neural story maps and begin to fill in information about the characters, their intents, and actions. In addition, you overlay your own life and your own characteristics on top of this story. Then you compare the two to apply the story's moral to yourself, asking questions like, ''If I had passed by, would I have stopped to help?'' ''Should I stop to help in the future?''

A **proverb** is an abbreviated parable (for example, ''Look before you leap,'' ''While the cats away, the mice will play''). A proverb is the essence of the lesson or moral of a parable. Though only one phrase in length, proverbs still activate the same blended space in listener's minds in order to understand the final moral provided by the proverb (Turner 1996).

Turner (1996) made extensive use of a story of a proud and clever donkey and an ox. The ox complained about all the work he had to do. The donkey bragged that he was so clever he could get the ox out of doing any work. His plan worked and the farmer, having lost the use of his ox, made the donkey do the ox's work.

Listeners use neural story maps and story structure to create a *story space* in which animals can talk and think as do humans. Listeners then overlay their prior knowledge of farm life and farm work on top of this talking-animal space to envision the work that must be done. Finally, they overlay their own experiences and their understanding of character stereotypes (''proud,'' ''clever,'' etc.) to evaluate the actions and outcomes for each character. Listeners then instantly, automatically blend all of this into a single, seamless whole and extract meaning to apply back into their own lives. That's the power of mental blending in action.

The ox and donkey story does it in parable form. The proverb ''Pride cometh before a fall'' accomplishes the same mental reasoning and blending in proverb form.

Metaphor

A metaphor ascribes characteristics of some known concept (mental domain) onto an unknown or unknowable concept in order to better understand the latter. The terms and characteristics from the first domain take on new meaning for the target domain within the space and context of a metaphor.

Lakoff and Johnson (1999) said it this way: ''Because so many of the concepts that are important to us are either abstract or not clearly delineated in our experience (emotions, time, ideas, value, peace, etc.) we need to understand them by means of other concepts that we understand in clearer terms (spatial orientation, journey, objects, etc.).''

What do metaphors look like? Examples include: he was a shooting star; you are my sunshine; I am a rock; I am an island; life is just a bowl of cherries; war is hell.

Lakoff and Johnson (1999) showed that ''our conceptual system (how we understand the world and create meaning) is largely metaphorical.'' They also stated, ''Primarily on the basis of linguistic evidence, we have found that human thought processes are largely metaphorical.''

There exists ''a huge body of empirical evidence gained from many different methods of inquiry that reveals and confirms the central role of metaphor in abstract thought'' (Lakoff and Johnson 2003). In the same book, they stated,

> After twenty years of research by hundreds of investigators, vast bodies of empirical evidence for conceptual metaphor have been gathered from studies in a wide range of fields within the cognitive sciences [e.g., Boroditzky 2000, Gibbs 1994 (both psychological studies); McNeill 1992 (gesture studies); Narayanan 1997 (discourse analysis); and Johnson 1999 (language acquisition)].

Examples of how metaphors permeate our daily thinking and conversation abound. Lieberman (2002) reported that the average American uses almost six metaphors or metaphoric references per minute of spoken language. The

metaphor we choose dictates our thoughts by defining which groups of concepts and images we can blend to create meaning.

Through which metaphoric lens do you view *argument*?

Argument is war.
Argument is a dance.
Argument is a fight.
Argument is a gift of energy and idea.

The metaphor you choose defines your viewpoint, expectations, strategy, and actions. It defines how you create meaning and how you view and understand the world.

How do you view *love*?

Love Is War: Love conquers all. All you need is love. Love is you and me against the world. Are you on my side or not?
Love Is Madness: I'm crazy about her. I'm head over heels in love. I'm drunk on love.
Love Is a Collaborative Work of Art: Let's build our love.

No metaphor is either right or wrong. They simply create radically different views of the world. The same is true for other common metaphors. Is time money? Is it "a river I go swimmin' in"? Is time a predator? Is it a gift? Does time stand still or "keep on rollin'"?

What metaphor would you use to characterize an idea? Is an idea a physical place? (His idea is far out.) A physical blockage? (He's trying to get around our ideas. We ran into a brick wall. She's logically backed into a corner.) A personification? (His ideas *explained* the movement of stars. His ideas *gave birth* to a new field of physics.) Are ideas food? (His ideas *left a bad taste* in my mouth. That idea's *half-baked*!) Or are they buildings? (Is that the *foundation* of your theory? When I presented my data, his ideas *fell apart*.)

In a comprehensive study of the form and use of metaphor, Debatin (1995) states: "My main argument is that the fundamental function of metaphor is that of rational anticipation." He argues that this is accomplished by treating a metaphor as a story in the mind and using neural story maps to create meaning from which anticipations and predictions can be drawn.

The mental process of understanding a metaphor is deceptively complex (Lakoff and Johnson 2003). Consider, for example, "He buttressed his argument." "Buttressed" is part of the *building* domain, an act of supporting and strengthening a wall or structure. Argument is a part of the *argument* domain (to forcefully interact in conversation to resolve conflict).

In order to merge these two concepts into a single, meaningful image, we have to examine character and intent. We apply attributes of the *building* domain that would make sense with what we infer "he" wants to do. We assume that "he" anticipates having a future debate or argument and feels that he needs to improve his material for that event. So, we imagine him trying to *strengthen* his arguments, improving the *foundation* for his presentation, adding new points to *widen and heighten* his argument.

By creating character, intent (goal), and actions we can extract the appropriate attributes of the source domain (*Buttress* in this example) and apply them to the

target domain (*argument*) in order to understand what he is doing and why he is doing it. The metaphor activates our neural story map that then guides our creation of the shared space for the two domains that are merged in the metaphor. Metaphor works through story.

The process is actually more complex than that because one concept may simultaneously activate many source domains in our mind. Part of our meaning of things (a chair, for example) emerges from our experience in the world (which is different for different people). Rosch (1977) established that we understand things in terms of their physical prototype (a chair has a flat seat, four legs, a back); **PLUS** our experience of that object (swivel chairs, bean bags, ledges, ergonomic chairs, barber chairs, etc.—based on the way the object looks and feels); **PLUS** our history of understanding of the function of a chair (confining, supporting, sitting); **PLUS** our experience/use of chair (how our body moves getting into/out of a chair, what we do in a chair, etc.). Thus, the concept *chair* means much more to us than is presented in the dictionary and our meaning for chair depends partly on how we metaphorically define chair by mapping other chosen domains of understanding onto it (for example, chair is a prison; chair is a retreat; chair is a work place). The amazing human mind is able to blend all of these possible domains together and extract appropriate characteristics to create reasonable meaning for every new batch of narrative information.

A simple proverb expands in our mind into a complete story (Johnson 1999). ''One good turn deserves another,'' for example, involves the essential creation of characters, expectation, intent, judgment, and actions (and is the appropriate proverb for the ant-dove-bird catcher story earlier in this chapter).

Event: Person A gives something good to Person B (one good turn).

Judgment: B now owes something to A.

Expectation: B is expected to, and should, give something to A.

Goal (Intent): B wants to give something to A to relieve the debt.

Meaning is gained through the application of story structure to the proverb.

These blending forms are basic to human thinking. Each represents a condensed story, using story form and story elements. Even metaphors and proverbs, the shortest and most abbreviated forms, activate complex mental projections using neural story maps. The power and appeal of these forms lies in the dense, concrete imagery they create and in their ability to activate many banks of knowledge and blend them into a single story line.

As they say in English class in a galaxy far, far away, ''Metaphors be with you!''

Language and Syntax Rules

A language consists of vocabulary words and the grammar rules by which they are strung together to create meaning. We create meaning by combining the literal (dictionary) meaning of words with the meaning created by grammatical rules according to a word's placement within the overall flow of a narrative. It is very much like notes in a melody. Individual notes such as C, B#, and A obtain meaning more from their relationship to other notes that precede and follow them than from their absolute tonal definition. Meaning for the sentence, ''Goldilocks ate the three bears' breakfast,'' depends on a complex set of rules for how you interpret and string together individual words.

However, language appears to have been acquired late in genetic evolution. It is so new that it acts like a guest, not yet claiming a permanent position in the brain as do vision, smell, or hearing (Kotulak 1999). Dr. Elizabeth Bates of the University of California at San Diego agrees. ''Language is a very recent phenomenon. The odds are very good that we built it out of old stuff [in the brain] that was not originally designed to process language'' (personal communication, 12/10/06).

Recent work has confirmed that Broca's area and Wernicke's area (both on the left side of the brain) are central to language (Pinker 2000), but other areas of the brain are also activated by the processes of listening or speaking. However, no all-controlling grammar gene or language organ has been identified (Pinker 2000). Still language and syntax encoding must exist somewhere in human DNA. New research techniques prove that ''babies know important things about language literally from the time they are born'' (Gopnik et al. 1999).

Pinker (2000) showed that children develop these complex grammars rapidly and without formal instruction and grow up to give consistent interpretations to novel sentence constructions that they have never before encountered. Noam Chomsky (1972 and 1980) called it our Universal Grammar. Making the same point, Engle (1995) wondered, ''How is it that children, born with no language, can develop the rudiments of storytelling in the first three years of life?''

Language and syntax rules, however, are critical to communication and to teaching. Our understanding of language, and the way that we learn it affects how we see the world. For example, English-speaking children are told more nouns by parents and are better at understanding categories. Korean children are told more action words and are better at understanding how their actions affect the world (Kotulak 1999).

Pinker (2000) adroitly noted the power of language and syntax when he observed, ''We belong to a species with a remarkable ability: we can shape events in each other's brains with exquisite precision. That ability is language. Simply by making noise with our mouths or by scratching marks on paper, we can reliably cause precise new combinations of ideas to arise in each other's minds.''

The mind understands individual sentences as mini-stories (Turner 1996; Pinker 2000). Each sentence includes an agent (character), an action (verb), implied intent (motive for the action), and implied outcome (the thing the action is supposed to accomplish, a goal). Grammar rules identify these structural elements and allow the mind to use story maps to create meaning from each sentence. Grammar rules exist to communicate *story* meaning, not *vocabulary* meaning (Pinker 2000).

Consider the possible sentences made from the three words, *dog*, *man*, and *bite*.

Man bites dog.
Dog bites man.
Man, dog, bite.
Bite man, dog.
Bite dog, man.

The order of the vocabulary triggers grammar rules to identify story elements in the readers' mind. Meaning comes from using grammar rules to establish a

main character, action, and object. From these you imply possible intents of the character and can then envision the situation and event surrounding the utterance of the sentence.

To further demonstrate the readers' need to create sentence meaning through story elements, Chomsky (1991) had a computer search books in print to find words that *never* followed each other in a sentence. He strung these words into a sentence:

Colorless green ideas sleep furiously.

The sentence is grammatically correct. The vocabulary is clear, but meaningless. We have no banks of knowledge, no experiences, no reference maps that allow us to create meaning.

Bruner (1986) said that words have two meanings: a timeless meaning (see the dictionary) and a contextual meaning. Of these two, the contextual meaning is always the more important for creating meaning in readers' or listeners' minds.

An example:

Yesterday I saw a bird. The bird was singing.

The shift from indefinite (general) to definite (specific) article signals that it is the same bird (only because we have agreed to refer to things that way). It's like a movie zooming in from an establishing panorama to one small point that will be the focus of the scene. However, if you reverse the articles:

Yesterday I saw the bird. A bird was singing.

Now we have no idea which bird was singing—just because I switched the two articles and now violate our syntax conventions.

As a final demonstration, consider how inserting the word *even* into the sentence ''John will marry Elise'' at different places radically shifts your interpretation of the sentence's meaning and how you interpret John's intent, attitude, and feelings as well as your evaluation of Elise. These changes do not come from the literal meaning of the sentence, but from the banks of experience you activate when you interpret the sentence using you neural story map.

John will marry Elise.
Even John will marry Elise
John will even marry Elise.
John will marry even Elise.

Emotions Rule

This mental tool needs little explanation. We automatically scan a person's face, body, posture, gestures, and actions to interpret their emotional state. From this information we decide if their emotions are what we consider appropriate for the setting and situation. If they are, we pay them no more mind. If not, our conscious attention is drawn to that person and we seek an explanation.

Pinker (1997) called humans ''feeling machines'' and spends considerable time describing the integration of feelings into interpretation and meaning as well as the influence of feelings on cognitive understanding and meaning. ''Humans seek meaning through feelings'' (Pinker 1997).

Hardcastle (2003) concluded that ''early emotional experiences form a 'core' around which we structure our views of ourselves and the world.'' Eder (1994) came to the same conclusion by saying that affective emotional ties are the most fundamental relationships and that we build our world view from there.

Hardcastle (2003) also showed that ''our experiences—the ones we remember, anyway—are those that have both sensory and affective (emotional) dimensions. In some respects the emotional side is the more important for it allows us to structure our world.'' (See also Damasio 1994 and Greenspan and Benderly 1997.) Emotional information triggers memory!

Mallan (1997) showed that ''stories differ from other narratives (arguments, scientific reports, articles) in that they orient our feelings and attitudes about the story content.'' He concluded that this emotional engagement is why information presented in the structure of a story is more easily remembered.

Story readers/listeners, then, need emotional information in order to judge and to relate to narrative characters. Story structure more readily provides that information than do other narrative forms.

Details

The idea of details, and of their importance in narrative presentations, is certainly neither new nor unexpected. By second grade, every student has heard teachers plead for more details in his or her writing. The cry becomes a universal teacher's writing mantra, ''More details. . . . More details.''

We humans are good at noting, recording, remembering, and recalling sensory details. I perform an hour-long story in which a side character appears twice—once near the beginning and once (49 minutes later) at the end. On several tellings, I have mentioned his black hair when he first appears and casually noted his brown hair at story's end. It always gets a reaction. A murmur rumbles through the audience. Something is wrong.

There is no reason for them to remember this character or his hair. Neither is important to the story. Yet, they do. We automatically remember the details. They are precious and critically important to us.

Think of any past (childhood) event. What pops back into your conscious mind? Mostly sensory details such as what things looked like, sounded like, or felt like. We tell our stories from remembered sensory details. We use observed sensory details to make a variety of important decisions about situations, people, and places.

Turner studied mental mapping processes associated with parables and concluded that ''specifics (details) of source and target stories allow the mind to overlay and create cross-identity.'' Details create the blended space through which the mind creates understanding. ''It is not possible to blend two stories without some counterpart connections of the details between them (source and target) to guide the blending'' (Turner 1996).

Tannen (1999) studied the nature and effect of details on listener/reader perceptions and ability to retain content information. She concluded: ''Details create the images that serve multiple purposes. First they set the scene. Second they provide a sense of authenticity. Third, they facilitate memory.'' Details create mental reality. In Tannen's words, ''Details create mental images, making possible both understanding and involvement.''

Sylvia Plath (quoted in Hughes and McCullough 1984) advised that one should write about the common, everyday details of life, because that is where

the magic begins. ''Write about the cow, Mrs. Spaulding's heavy eyelids, the smell of vanilla flavoring in a brown bottle. That is where the magic mountains (involvement, understanding, and memory in her terms) begin.''

How do simple details accomplish this massive task? Tannen concluded, ''Story merges abstract information with common sensory details to create context and relevance for the abstract. An example from Tannen (1999):

''I wish you were here to see the sweet peas coming up.''

The first half is abstract and not engaging. It is conceptual information. The second half is pure sensory detail and engages the reader's attention, emotions, and mental imaging process.

We've all heard of details, but what, exactly are they? From the dictionary:

> **Detail: n.: Any of the small parts that go to make up something as of a picture, statue, setting, building, etc.** (from *Webster's College Dictionary*)

The purpose of details is to provide the specific references that create mental images and allow the receiver to overlay their own maps and banks of experience over the new material by matching detail points.

WHY DO WE DO IT? WHAT IT MEANS FOR US

Why *do* we do it? Why consume massive amounts of time and mental energy concocting and rearranging information to enforce the 7-Eleven system on narrative and experiential inputs? The answer is to create meaning in the conscious mind and to facilitate memory. The key to that process is that the 7-Eleven concepts and techniques determine if it is possible to create two essential commodities: context and relevance that form the gateway to meaning. By definition (*Webster's New World College Dictionary*):

Context is: ''The parts surrounding a specific word or passage that determine its exact meaning; the whole situation, background, or environment relevant to a particular event, person, creation, etc.''

Relevance is: ''Bearing upon or pertinent to the matter or person at hand; implying close relationship with and importance to the matter under consideration.''

In a practical sense, context identifies the banks of prior knowledge you can use to make inferences, to blend with the new information, etc. Relevance describes how this new information relates to you, personally. Learning that the moon is dusty and that moon dust is both corrosive and jagged with the potential to grind like pumice might be interesting to you. You have a context for information about the moon and can integrate it into your existing bank of knowledge. However, that information does not relate to your life. It has no relevance—unless you are an astronaut slated for the next moon mission. Then this information is vitally relevant. Context and relevance trigger the conscious mind to pay attention and to remember.

Bransford and Brown (2000) showed that

the research shows clearly that ''usable knowledge'' is not the same as a mere list of disconnected facts. Experts' knowledge is ''conditionalized'' to specify the context in which it is applicable and its relevance to the topic and individual; it supports understanding and transfer (to other contexts) rather than only the ability to remember.

Learners of all ages are more motivated when they can see the usefulness (relevance) of what they learn and its impact on their own lives (McCombs 1996, Pintrich and Schunk 1996, Bransford and Stein 1993). Knowledge that is not provided within a contextual framework is often "inert" because it is not activated, even though it is relevant. The same is true for contextual information that is not relevant (Glaser 1992, Bransford and Brown 2000).

While assessing the continuing effectiveness and popularity of classic children's stories (Cinderella, Sleeping Beauty, Pinocchio, etc.), Crossley (2000) showed that "stories provide the context and relevance for conceptual information." Crossley concluded (as had Howard 1991, Priest 1996, and McLeod 1997 before her) that story structure creates context and personal relevance within which a child can "play out conflicts of good and evil."

Approaching the topic from a more mechanistic perspective, Schank showed that if a person has index labels in memory (similar to the labels on file folders in a desk drawer) and past experiences filed under those labels, then new experiences they read about are deemed "relevant." The person pays attention and remembers the new information. If the person lacks appropriate index labels, or if no experiences are filed under those labels, then the new narrative is deemed meaningless and uninteresting. "The determination of relevance determines the suitability of something to enter into memory" (Schank 1990).

"In the most general sense, the contemporary view of learning is that people construct new knowledge and understanding within the context of what they already know and believe and do it only when they can see how the new information is relevant to them" (Cobb 1994). Our elaborate mental system of neural story maps, story frameworks, concepts, and techniques exists to create these two demands of the conscious mind if it is going to pay attention: *context* and *relevance*.

CHAPTER 6

THANKS FOR THE MEMORIES

Information is remembered better and longer, and recalled more readily and accurately when it is remembered within the context of a story.

For anyone with a message to convey—any teacher, manager, leader, scientist, trial lawyer, or clergy—what's the brass ring you stretch to grab? What's a gold medal performance? It's lodging your message in its original form—as you conceived and delivered it—into the receiver's active memory banks. Thus, there exists one more aspect of mental function we must review before we can construct our definition of effective stories: *memory*. Why do we remember some things and not others? What things do we chose to remember? How does memory happen?

While assessing the goals of any communicator, Schank (1990) said, ''The goal is not merely to say the information, but to lodge that information into the mind and memory of the listener and to convince them to believe and use the content information. This is accomplished by linking content information into stories that will trigger memories and index labels in the mind of the listener.''

MEMORY MECHANICS: MAKING MEMORIES

Kotulak (1999) described the bioelectric-chemical version of memory this way: Prompted by some neuron, a neurotransmitter (glutamate) races between neural cells like a bicycle messenger yelling to the gateway controllers on other cells (called NMDA signal boxes), ''Pay attention, there's something coming you might want to learn!'' That causes the signal box to open a door into the cell. An electrical charge from energy-carrying sodium atoms surges through those doors. Other cell doors open to allow a squirt of calcium to enter and, like a car's spark plug, ignite the sodium-based electrical charge into a streaking bolt that slams across the cell. This prompts the cell to alter and adjust its synapse connections forging new memory pathways to record the new information.

In 1984, Northwestern University's Aryeh Routtenberg discovered a chemical inside brain cells called PKC that forms short-term and long-term memory. Once a cell is alerted (by glutamate) that it needs to form a memory, and as sodium and calcium rush in, a second chemical messenger notifies PKC. PKC then runs over to another protein, F1, and pitches a phosphate molecule at it. The phosphate wakes up F1 and, as an electrical charge explodes across the cell, F1 trundles down the branches of the cell (axons) to make those appropriate changes in the synaptic connections. Presto, memory!

If we step back to the level of brain areas, Newquist (2004) described brain anatomy including memory controllers. The hippocampus and the amygdala work together to help you understand and deal with emotions (yours and others') and nonverbal sensory information. The emotional tag created by the amygdala controls the strength of a memory and the likelihood of its recall.

You may not remember the first time you touched a dog, but you will remember the first time a dog bit you. You won't remember the first time you kissed your grandmother, but you will remember the first time you were kissed on a date. (However, you don't remember your twentieth kiss on a date because it was less emotional and had a weaker emotional tag.)

Schacter (1997) reported that the same areas of the brain are engaged and activated for the recall of true (experienced) and for false (imagined, created, or planted) words and events. The same is true for the parts of the brain that implant true or false events into memory. Human memory circuits don't seem to distinguish between real and false memories. That job is left to the reasoning power of the conscious mind.

REMEMBER THE ALAMO!: WHAT YOU REMEMBER

Smith (2003) studied the process of remembering and (supporting earlier research by Korte 1996) concluded that ''vivid memories have four features: they break a script (an expectation), they are consequential (have impact), they involve emotional charge, and they have value (meaning) for the person remembering.'' The things you remember have meaning to you, break your expectations (and so require attention and explanation), and are relevant to you. These are all techniques or concepts we have previously visited that the mind uses to filter and prepare information for the conscious mind.

Given those *characteristics* for a memory, *what* do you remember? Pinker (1997) said, ''When you put down a book, you forget almost everything about the wording and typefaces of the sentences. What you take away is their content, or gist.'' Experiments by Schank (1990), Schacter (1995), and Smith (2003) have shown that only a tiny percentage of humans remember word-for-word what they hear or read. We remember the gist and create our own wording to file into memory and to recall.

The gist comes from the original text, but also includes your interpretation of it and the meaning you create from it (Pinker 2000). Thus, no two people remember exactly the same gist even though they witnessed the same accident, read the same article, or heard the same speech. Schank (1990) offered extensive research to support his way of making the same point: ''This act of mental story composition profoundly affects memory. Memory tends to lose the original (sensory input) and keep the revised copy (mental story map creation).''

Least this sound like the story mapping and story creating process harms memory in some way, in his seminal work Mandler (1984) drew together

extensive evidence to show that: *Experiences <u>not</u> framed into story suffer loss in memory*. Story structure *enhances* memory and *improves* our memory of content information.

Zaltman (2003) concluded, ''Storytelling is central to memory.'' Similarly, Carey (2007) stated, ''Numerous studies show that people tend to remember facts more accurately if they encounter then in a story rather than in a list [or other narrative forms].'' Zaltman (2003) also said, ''Storytelling is not something we just happen to do. It is something we virtually have to do if we want to remember anything. The stories we create are the memories we have.''

Concurring with this idea, Bruner (1987) concluded, ''I believe that the ways of telling and the ways of conceptualizing a story that go with them become so habitual that they finally become recipes for structuring experience itself, for laying down routes into memory.'' While assessing why stories are easier to remember, Schank (1990) concluded, ''A story, remembered as a story, is a unit that can be easily found, easily recalled and told, and be made useful for a variety of purposes.''

Smith (2003) split memory into fact-based memory and story-based memory and showed that story-based memory creates intent, form, structure, sequencing, coherence, and meaning. ''The stories we tell time and again are identical to the memory we have of the events that the story relates.'' The mind creates stories from events and then remembers the created stories believing that they are identical with the original event.

Compounding this phenomenon, Schacter (1995) showed that ''the output of human memory differs—often substantially—from the input.'' He concluded that ''remembering can fail not only because information is forgotten over time, but also because it is changed and distorted during memory and recall.''

Neimark (2004) described research by psychologist Henry Roediger of Washington University in St. Louis. Roediger stated, ''People *never* capture anything literally. Whenever you encode an experience you filter it through your own awareness.''

Moreover, memory automatically brings with it an interpretation that alters the factual presentation of the memory because we view past events from our present perspective and with our present knowledge (Freeman 2003). For example, the memory, ''And that was the last time I saw her, the last words she ever spoke,'' takes on far greater significance not because of the historic event, itself, but because of our present knowledge of its significance. Present knowledge always alters the past.

Would you remember the Alamo if the Mexican army had decided not to attack and had drifted on, leaving the defenders to fend for themselves? Would you remember that Crockett and Bowie were there if *none* of the men had died? Would you remember Bowie if his knife design hadn't survived him to become well-known now?

Other work reported by Neimark (2004) and by Schank (1990) confirms that, each time you tell a remembered story event, you create additional sensory detail and then cannot distinguish between original (true) detail and the newly created (false) detail. You then remember it all as if it were all true, original detail. Schank theorized that this is why personal stories grow and drift over time with repeated telling.

Gopnik et al. (1999) studied what patients recalled from past events and concluded, ''When we remember our past, we recapture not just the physical details of what happened, but what we felt about what happened.''

Tannen also focused her studies on the effects of details on memory. ''Images created by sensory details, I am suggesting, are more convincing and more memorable than abstract propositions'' (Tannen 1999). We remember details (including those we created) and we remember the emotions we felt during an event.

Neimark (2004) reported that Harvard Professor Richard McNally believes he can prove that people routinely make up memories. Neimark stated, ''His research suggests that all memories—even false ones—are not just accessories of experience. Memory *is* experience.''

Neimark (2004) also reported on work by Dr. Kathy Pezdek, psychologist at University of California, Irvine, who has been able to implant false memories into people in lab studies (for example, that they were lost in the mall as a child, that they hugged Bugs Bunny at Disneyland—there is no Bugs Bunny at Disneyland). These false memories were as real to subjects as actual memories.

What we remember is what breaks expectations and is relevant in some way. Then we remember the gist. We remember the sensory details of an event and how we felt. But what we remember is not explicitly what happened. We remember the stories we mentally create about what happened, augmented by details we inadvertently create, and altered by the process of remembering and recalling and by repeated telling. Ultimately, what we remember are our own mental story creations.

REMEMBER ME FONDLY: HOW YOU REMEMBER

Memories are not fixed and solid things. They are not like cement that, once set up, can never change or be altered in shape and structure. Research has already been mentioned that has established the variability of recall and the lack of precision in our memories.

Loftus and Ketchum (1996) concluded that ''memories don't sit in one place waiting patiently to be retrieved. They drift through the brain, more like clouds or vapor, than something we can put our hands on.'' Considerable effort has been required to make any definitive statements about how information gets into, lingers in, or comes back out of memory.

As an example of how variable human recall is as a function of present mood, Braun-LaTour and Zaltman (2006) report on an experiment they conducted. Moviegoers recorded their initial impressions of a movie immediately after viewing it. Some of those expressing a negative opinion were, later, shown a positive review of the movie and then asked to recall and describe their initial opinion. Virtually all recalled their own initial opinion as being more positive than it had been—though none thought they were changing their initial opinion in any way and all believed that they were accurately recalling their initial statements. Others who were not shown the positive review accurately recalled their initial negative opinions. Merely reading a positive review affected how people recalled their own memories.

Research has been able to identify common trends that strongly influence how and why humans tend to remember.

Information in Story Form

As mentioned above, Mandler (1984) and Mandler and Johnson (1977) showed that experiences not framed into story suffer loss in memory. Schank

(1990) went further, saying, ''The major processes of memory are the creation, indexing, storage, and retrieval of stories.'' He also stated, ''We have great difficulty remembering abstract concepts and data. However, we can easily remember a good story.... Stories provide tools, context, relevance, and elements readers need in order to understand, remember and index the beliefs, concepts and information in the story'' (Schank 1990).

In an interesting twist on memory studies, Foer (2006) studied the memory systems competitive memory champions use to remember new strings of random information. The most common scheme involves creating a character, action, and object for each thing to be remembered (the order of cards in a deck, for example) and then stringing those prememorized images along a temporal pathway (plot). Those are all common elements of stories. Memory champions remember by creating a story that provides context and relevance for meaningless information.

Details

A neurocomputer modeler, Anderson (1993), reverse-engineered human memory retrieval. He found two overriding factors that determine the ease of retrieval: the perceived relevance of the information at the time it was committed to memory, and the density of attached sensory details. He also found that the more often you recall something out of memory, the easier it is to do so again in the future.

Squire (1997) and Schacter (1997) both studied the different features of learning that contribute to the durability or fragility of memory. While comparing people's memories for words with their memories for pictures of the same objects, both showed consistently significantly superior memory for the picture due, primarily, to the greater density of sensory details associated with the picture.

Foer (2006) concluded his study by saying that successful rememberers regularly ''link the thing they want to remember to colors, familiar names, events, visual images, and then string individual items along familiar paths in order to associate more of their already established sensory images with a new bit of information to remember.'' They tie new information to existing remembered details to facilitate memory of the new information.

Events That Have Emotional Impact

Anderson (1993) also showed that emotional *coloring* of experience strongly influences memory storage and the likelihood of recall. How you felt about the new information at the time you remembered it is a key part of making the information readily retrievable. You meet hundreds—if not thousands—of people each year. Typically, the only ones you remember are those that generated a strong emotional reaction in you. Your emotional reaction coded that person for memory and recall.

Mallan (1997) showed that ''stories differ from other narratives (arguments, scientific reports, articles) in that they orient our feelings and attitudes about the story content.... This emotional engagement is why info presented in the structure of a story is more easily remembered.''

Neimark (2004) described several recent studies that showed that vivid visualization *accompanied by emotions* trigger far more activation in the brain in

the visual processing systems than did the images alone. Emotions create the mental associations (activity) that facilitate memory.

Attaching Index Labels to an Event

Schank (1990) spent decades studying the process of memory and concluded, ''Memory, in order to be effective, must contain both specific experiences and index labels.'' He continued, ''Stories are effective because they contain many possible index labels that allow the listener to attach the story into memory in more ways and into more existing indexed experiences and memories.'' Index labels are reference points in the new material that access banks of prior knowledge or key information points in neural maps. Because of a story's ability to create more index labels in the human mind, Schank concluded that ''human memory is story-based.''

Similarly, Bransford and Stein (1993) showed that ''researchers have found that memory is affected by our ability to relate new information to previous experience and knowledge.'' Bransford and Stein called the process *elaboration*. It is the same mental process that others call *blending*.

Context and Relevance

Foer (2006) also studied S. V. Shereshevski, the most famous ''natural'' memory champion (as opposed to those who devise and use a memory system). Shereshevski could recall long lists of numbers memorized decades earlier and complete poems he learned when he was four years old. His problem (and torment) was that he couldn't forget anything. How did he finally learn to forget? He learned to convince himself that the information he wanted to forget had no meaning or relevance to his life. With no meaning or relevance, unwanted memories faded from his mind.

Neimark (2004) similarly concluded that the many studies into false memories that have reported inconclusive results all ignored relevance and meaning and that this omission explained the scatter in their data. We remember better what our mind says is meaningful and relevant to us.

WHAT IT MEANS FOR US

Both the acts of remembering and of recalling are triggered by a greater density of sensory detail, by an emotional impact, by the presence of known context and relevance, and by the presence of multiple indexing labels. These, in turn, are all created by story structure. Using stories enhances memory and facilitates information recall. That applies both to the story, itself, and to pertinent information (for example, concepts, facts, attitudes, and beliefs) contained within the story.

Note that whether the story is historically accurate and truthful or fiction, and whether the pertinent information is fact or fiction, does not enter into the process of creating and recalling memories. It is the form, not the veracity of the content, that determines how memorable each receiver determines it to be.

I am not saying that everything should be woven into story form. Not at all. I am saying that the narrative structure I call a *story* significantly improves the likelihood that your content will be remembered and recalled. That structure, of

course, does not come for free. It means that a quick cost-benefit analysis is in order. The benefits of story—as we have and will continue to see—are remarkable. But that narrative advantage comes at a price. You must be able and willing to mold your material into story form and to develop and present the essential informational elements that form the core architecture of stories. Stories require more verbiage, more time, and more developmental effort.

If you can, terrific! The rewards of story are yours. But there are many instances where it is either not feasible or not appropriate to create and present stories. Not everything either can be or should be delivered in story form. But it is always worth checking. When you can, the benefits are staggering.

CHAPTER 7

THAT REMINDS ME OF A STORY: A BETTER DEFINITION

> *The key elements of human mental processing provide a more accurate and meaningful definition of what we really mean when we say ''story.''*

Fireman et al. (2003) concluded that ''good'' stories are coherent, organized, meaningful, and compelling. Schank (1990) said that ''stories should be compelling, concise, and easy to remember.'' Those are *characteristics* we seek. Our definition of story should guide creators toward stories that deliver those effects. Pinker (1997) put it succinctly. ''It is irrational to insist that story structure remains unexplained after all of the manifestations of it have been explained and accounted for.''

By reviewing the mental activities presented during the past four chapters, we will identify those key narrative elements that direct the mental gymnastics readers and listeners employ to create context, relevance, and meaning from incoming text. These same elements define a story for the human mind and will be the elements we use to create a more rational and definitive (and certainly more useful) definition of story than that offered by most dictionaries.

Search Chapters 3 through 6 and you will find a surprisingly short list of these core elements. I find five around which all others revolve. These are the five narrative elements researcher after researcher has identified as critical to the processes of creating understanding, interpretation, meaning, context, and relevance.

All five must be presented (or created) in order for the mind to relate to, understand, and decide to pay attention to, an incoming narrative. These then are the informational elements that uniquely define a story.

1. **Character.** You need a viewpoint character to see who is doing the action and to gauge relevancy by assessing this character. To do that, you need perspective, viewpoint, and sufficient detail about the character to interpret

emotional state, beliefs, attitudes, and to activate our ''character'' banks of prior knowledge and experience as well as your neural story maps to create meaning and relevance.

2. **Intent.** You need to know what story characters are after and why. As discussed, intent is composed of two key elements: goal—what the character is after (goal defines story outcome or *resolution*)—and motive—why that goal is important to the character. Goal and motive reveal the point and purpose of a story as well as of every scene and event in it.

3. **Actions.** You need to see what characters *do* to achieve their goals. You will assess character's beliefs, attitudes, and values by comparing their actions to banks of expected or ''normal'' behavior. The definition for *actions* corresponds to the dictionary definition for a story (''a narrative account of a real or imagined event or events''). Actions are the plot. In a story, you want to see those events—and only those events—that relate to a character's efforts to reach a goal. Stories exist to explain and to illuminate characters.

4. **Struggles.** Struggles are never easy or trivial. Struggles break with expected, normal behavior. Struggles are actions characters take in the face of risk and danger. Actions make no sense and elicit no interest unless we see that these actions represent an attempt to reach an important goal.

   However, there can be no struggle unless there is something to struggle against: obstacles that block a character from reaching a goal. Obstacles may either be conflicts (blockages created by other characters—or entities—in the story) or problems (blockages not created by a character). Obstacles may either be internal (the best fighting is against yourself) or external (created by something outside the character). The risk and danger they create need not be physical. Emotional, mental, social—any kind will do as long as it is real to the character.

   To establish context and relevance, we need to know that something is at stake. We need to be aware of the risk and danger a character will have to face and we need to see the character act and make decisions in the face of those obstacles and that risk and danger.

5. **Details.** Details about the character, settings, actions and events, and objects that drift through a story create the mental imagery that you use to envision and evaluate the story. Details facilitate blending and memory.

DO RESEARCHERS AGREE?

Before I combine these essential elements into a concise definition, do other researchers agree with the elements I have identified and the approach I have presented here?

Dalkir and Wiseman (2004) stated, ''All stories are narratives. But not all narratives are effective stories.'' Stories are a specific subset of the more general narrative characterized by specific structural elements.

Bruner (2003) concluded, ''Everyone will agree that it (a story) requires a cast of characters who are free agents with minds of their own. These characters must have recognizable expectations about the ordinary state of the world—the story's world. The story begins when there is a breach in the expected state of things. Something goes awry. Otherwise there is nothing to tell about. And finally there is an outcome, some sort of resolution.''

He lists characters, goals (intentions), problems and conflicts that cause something to go awry, struggles, and resolution. But central among these elements is character. ''Every story is *somebody's* story. Every story is about a character'' (Bruner 1990). And about that character's intentions, he said, ''There is widespread agreement that stories are about the vicissitudes of human intention'' (Bruner 1987).

Turner (1996) broke an overall story (his term is **STORY!**) into a series of miniscule, ''small spatial events.'' (He calls these ''stories.'') To Turner, a story consists of just an agent (character or object) and an action. ''The ball rolled,'' is a story. So are each of the following sentences. ''She stooped to pick it up. Her arm swung. Her hand released the ball. The window shattered.''

Turner (1996) developed the notion that conversion of such a series of atom-level stories into a composite **STORY!** requires the addition of *intention* to bind individual atoms into a coherent and cohesive chain molecule of a story. As an example, here is an action (a story):

Mother pours milk into a glass.

To convert this to a **STORY!**, Turner says that we must add intent (goal and a motive to explain why that goal is important), conflicts for ''Mother'' to struggle against, and a point of resolution. As an example Turner offered:

> Mother has been crippled by a stroke, her left side partially paralyzed. She fights to regain the use of her left hand and arm, feeling that her independence and dignity depend on being able to use that hand to fulfill her normal motherly functions. But her left arm is frightfully weak, her grip alarmingly uncertain. The milk carton she used to pour into glasses each day for her children is painfully heavy and slippery. It slips and falls; she spills; she misses the glass; she overfills it, sending a white flood across the counter and dribbling onto the floor. Through tears of embarrassment and frustration, she is determined to pour a simple glass of milk for her son. She <u>has</u> to. She struggles to will her arm to make one more try....

Now it's becoming a **STORY!** We still need to know what happens—whether she succeeds or not and how she (and her family) feels about it. But the elements are in place to turn the original action into a compelling story. Character, a character's intention, and a character's actions leading to resolution of that intent form the core of Turner's story model.

Cliatt and Shaw (1988) put it more simply: ''All stories are based on character.''

Taylor (1996) defined story as ''the telling of the *significant* actions of characters over time.'' He then explained the word *significant* to mean moments that define the flow of the story toward some important goal and moments where characters face important choices. The choices characters face is a central theme of Taylor's work. ''We remember characters from stories long after we've forgotten plot, language, and theme. The allure of character is the mesmerizing attraction of watching people struggle to make decisions'' (Taylor 1996).

Classical dramatist and theoretician Kenneth Burke (1969) concluded from his studies of theater and drama that ''well-formed stories'' are composed of a pentad of elements: actor, action, goal, scene, and instrument—plus trouble. He defined trouble as an imbalance between any of the five elements of the pentad.

Note that Burke claims that goals must exist *before* trouble (problems and conflicts) can arise. Trouble, for Burke, must be resolved in order to reach a goal, but solving trouble, itself, is rarely the main goal of a successful story.

Egan (1997) researched one specific defining aspect of a story—the ending. Agreeing with Kermode (1966), Egan (1997) concluded, "The crucial feature of stories is that they *end*. In life we are always 'in the midst' and so cannot determine and ascribe meaning to events." Egan's research also showed that "we know we have reached the end of a story when we know how to feel about the events that make it up."

He introduces an important point here. Egan showed that *meaning* requires a character-based perspective point that includes knowledge of a story's end. Value comes from applying that meaning to our real lives that so rarely have definitive ending points. Readers know that they've *reached* the end when the goal of the main character is resolved—one way or the other. Readers know how to *feel* about the story by seeing how the main character feels after resolving his or her goal.

Bransford and Stein (1993) tried to approach story understanding by focusing on the nature and purpose of story problems. "A problem exists when there is a discrepancy between the initial state and a desired goal state, and when there is no ready-made solution for the problem solver." Several important concepts are woven into this statement. First, stories have a desired goal state different from the initial condition. Second, the character cannot have ready access to his or her goal. Third, the story must force this character to struggle (face risk and danger as they attempt to solve problems and conflicts) in an attempt to reach his or her goal.

Johnson (1999) studied the structure of stories deemed "successful" by his test audiences and concluded that story is differentiated from a mere event (something that happened)—as Yale psychologist and historian Ricoeur (1984) said—by the presence of seven features:

1. Goals (Actions are directed toward goals.)
2. Motives (Actions and goals are explained by giving reasons why they were identified and performed.)
3. Agents (Some character must adopt the goal and perform the action.)
4. Contextual Circumstances (Actions are embedded within a morally significant context that determines their character.)
5. Interactions with Others (Events unfold as protagonist interacts with other characters in the story.)
6. Meaningful Existence (All goals and actions are part of an intentional hierarchy of thoughts and actions that leads to an attempt to lead a meaningful, fulfilled life.)
7. Responsibility (Agents must be responsible for their actions.)

A simple event (flipping on a light switch) becomes a compelling story only when these features are added. Is the goal of this action to surprise a burglar? To see if the power has been turned back on? To find a treasure map? Or to prove that the crippled fingers after a stroke have regained enough control to be useful? Who is the person who flips the switch and why is this action important to them and significant (relevant) to the reader? How does our character interact with other characters as a result of this simple action? Now we are well on the way to creating a story. When these features and events are mixed in a temporal

ordering (a plot) they will create meaning and understanding in the reader (Johnson 1999, Ricoeur 1984).

Finally, Denning (2001) used trial-and-error methods to devise stories that would be successful in changing attitudes and policies in a large international agency (the World Bank). He concluded that ''stories that were successful for me had certain characteristics. They were told from the perspective of a single protagonist who was in a predicament that was prototypical of the organization's business.... The story had a degree of strangeness or incongruity for the listeners so that it captured their attention and stimulated their imaginations. Yet at the same time, the story was plausible, even eerily familiar.'' Thus, Denning found the same core elements not through rigorous research, but from the vantage point of a trial-and-error practitioner.

These examples represent the thinking and conclusions of many other researchers. Prominent examples that I omitted from this chapter include Snowden (2000), Prince (1987), Bal (1985), Barthes (1982), Bruner (1990), Ambruster et al. (1987), Polkinghorne (1988), Frye (1957), Fisher (1987), Rubin and Greenberg (2003), Shank and Abelson (1995), Knitch and Van Dijk (1975), and Steffen (1977), among others.

WHAT *IS* A STORY?

The wording of this new and improved definition is mine. However, every term in it is supported by extensive evidence presented in the past four chapters. It is consistent with results from the researchers mentioned above. It is fully consistent with documented activity of the mind.

It would be easier if we had a separate word to use to avoid confusion. Unfortunately, we don't. So I will use the word *story* for my definition even while acknowledging that many you encounter will use the same word in the more general and less accurate sense presented in the dictionary in which *story* and *narrative* are virtually synonymous.

A Better Definition: What we *really* mean by the word, **STORY**:

> *Story: n.: A detailed, character-based narration of a character's struggles to overcome obstacles and reach an important goal.*

Compare this definition with the dictionary's: ''a narrative account of a real or imagined event or events.'' The dictionary's definition focuses on event or events and is thus plot-based. In plot-based narratives, this happens, then that happens, and then that happens. Plot-based narratives do not spark your interest or create meaning.

Stories are *character-based* and are driven by the details that describe that character's goals, motives, obstacles, and struggles. Through the addition of character, goal, motive, and obstacles to the definition lies a world of difference that creates story's unique power and effectiveness. Events happen not for their own sake, but to explain the struggles of a character.

The general term, *narratives*, may be plot-based event descriptions, stories (character-based), or information-based articles, reports, data sets, and other similar documents. Information-based narratives provide just the new essential information and assume the reader has adequate banks of relevant topical prior knowledge to create context and meaning and sufficient related personal experience to create relevance. Science writing tends to be in the form of

information-based narratives. It's like Sergeant Friday on the 1960s TV show *Dragnet*: ''Just give me the facts, ma'am. Just the facts.''

All three types of writing are narratives. Only stories are structured around the character-based informational elements receivers need in order to trigger and successfully drive the mental processes that lead to understanding; to the creation of meaning, context, and relevance; and to active memory.

WHAT IT MEANS FOR US

This definition lays out the pathway to mastering stories. Stories are centered on character and are structured around the goals and motives that drive characters and then on the obstacles that block them from achieving those goals. Plots are formed of the characters' struggles to try to overcome obstacles to achieve goals. Only those actions and events that are relevant to a character's struggles are relevant to the reader.

While analyzing the structure of hundreds of life stories, McAdams (2005) discovered the health and therapeutic value of redemptive stories. By definition, redemption is ''a deliverance from suffering to a better world.'' McAdams found that patients who told their stories as redemptive stories healed faster than those who didn't.

''Every dark cloud has a silver lining.'' ''When life gives you lemons, make lemonade.'' ''No pain; no gain.'' ''It's always darkest just before dawn.'' These are metaphoric expressions of a redemptive outlook expressing the general view that ''good can come from bad,'' or that ''you can transform a negative into some kind of positive.''

McAdams (2006) showed through his research that ''redemptive stories promote psychological health and maturity.'' Redemptive stories create hope, support, determination, confidence, and perseverance in the patient. Patients with redemptive outlooks view their story as leading from current suffering and struggle to a place of wellness. Research shows that such a positive attitude significantly affects healing. Redemptive stories alter patient moods and tend to convert their moods and outlooks to redemptive ones (McAdams 2006).

Redemptive stories do not avoid struggle and suffering. Just the opposite. They require it. Redemptive stories abound in folk literature. Research by McAdams and others has established the unique power of redemptive stories to impact the listener and to alter listener mood and outlook in a positive way. The point to emphasize here is that redemptive stories are not specifically ''happy'' stories. Redemptive stories emphasize problems and suffering. Redemptive stories require struggle—the more the better. Redemption is only gained *through* toil and suffering. Research shows that ''simply telling or writing upbeat, happy, optimistic stories does not correlate well to measures of self-esteem, life-satisfaction and life coherence. Redemptive stories do'' (Taylor 1996).

Any narrative can be converted into story form by reorganizing the material around the character instead of around information or events (plot). With this improved understanding of the substance of, and meaning of, *story*, we can turn to the research with a better sense of what each researcher means and establishes when they describe their research.

PART 2

STORY PROOF

CHAPTER 8

A PEEK AT THE ANECDOTES

> *Anecdotal experience provides compelling and dramatic evidence of the effectiveness of stories.*

It's time to examine the evidence to support the value of and use of story. In addition to mounds of quantitative and qualitative research, I have collected anecdotal experiences from over 1,300 practitioners (950 teachers, 100 librarians, 110 storytellers, and the rest split between youth and community program directors, writers, clergy, businessmen, organizational leaders, and clinicians). It is worth repeating: every bit of this mass of anecdotal data concludes that stories and storytelling are powerful, beneficial, and effective. None—not one— reported a negative experience.

What does this anecdotal evidence look like? I mentioned several such personal anecdotes in Chapter 1. Here are six others, typical in scope and specificity to many of those I have collected.

SIX EXAMPLES OF ANECDOTAL EVIDENCE

High-School Music Teacher (Music from on High)

Dan Fossler, a California high-school music teacher, took a one-week summer storytelling course from me and created a story of the Italian composer Vivaldi for his final exercise. The story was a rousing hit. So he told it to his student orchestra the next fall before assigning them a Vivaldi piece to learn. He was amazed at how quickly this orchestra mastered the difficult music.

He scanned their home practice logs and found that this group was practicing an average of 20 percent more on this piece than had his previous orchestras. When he asked them why, they replied that Vivaldi was ''cool'' and that they liked him and his music. Ten students had gone to the library to check out

additional reading material on Vivaldi. In short, Fossler's story made Vivaldi real, meaningful, accessible, and interesting in a way that the music alone never had. It created context and relevance. Stories do that.

High-School Biology Teacher (Evolutionary!)

David Crenshaw, a Sacramento, California, area high-school science teacher took a similar summer course from me in the late 1990s. Charles Darwin was his favorite scientist. For the day he talked about Darwin in his Introduction to Biology course, he came to class dressed in period costume and had worked his Darwin material into first-person story form. He casually noted that students did better on test questions about Darwin and evolution than they did, on average, for other test subjects. He assumed it was because everyone knew about and liked Darwin.

Then he took a story course and realized that he was telling his Darwin material in story form. He decided to test the hypothesis that stories are a better way to teach factual and conceptual science information. He chose three other prominent scientists (Gregor Mendel, Sir Isaac Newton, and Louis Pasteur), created appropriate costumes, and converted his lectures on these three into stories. He also isolated questions on quizzes, chapter tests, midterms, and finals that related to material he delivered in story form.

The Intro course was offered once a year. After two years (about 60 students) he was already able to say with certainty that students absorbed significantly more information—in an absolute sense—on story days than on lecture or activity (experiment) days. More impressively, he could show that students were better able to *apply* the information they learned through stories into new situations. Crenshaw considered this a miraculous accomplishment that matched his definition of the highest form of learning. Stories create learning.

Students learned more, learned it faster, retained it longer, recalled it more accurately, and could apply this new knowledge better if the information was delivered in story form. As a side bonus, he found that his use of stories as a teaching vehicle made reluctant science students more interested in class and in studying science. Absentee and cut rates dropped. The class's rate of successful homework completion rose. Story is a more effective and efficient way to teach.

David planned to wait for two more years to compile a larger sample size before publishing the statistical results of his classroom study. Unfortunately, after the second year of his four-year plan, he moved out of the state and was unable to complete his study.

Corporate Lecturer on Knowledge Management (The Real ''Stick'')

Through several articles, Seth Kahan (2001a) described a story-based process he uses. He has presented a story poem to begin his presentations at hundreds of conferences and sessions with KM (knowledge management) business leaders. Following this recitation, he passes a Native American talking stick from person to person, giving them a chance to relate what they experienced or thought about during the poem. (The person holding the talking stick has the floor.)

He reported that this simple activity literally shifts ''who'' is in the room from job titles and corporations to parents, partners, and community members with deep concerns, personal struggles, fears, hopes, and passions. The story induces

them to listen ''with both their cognitive and emotional minds.'' His story encourages participants to share personal information outside the strict context of their jobs. It makes each participant relevant to others and creates a new level of context through which they can work with each other.

Kahan says that ''first of all, this type of community storytelling invites the whole person into the workplace conversation—tacit knowledge and all.'' A well-chosen story creates relevance and context for a different aspect of the participants than just job title and position. ''Second, the end product of this type of storytelling interaction is people working better together'' (Kahan 2001a).

Illinois storyteller Dan Keding created a warrior story whose last line is: ''My grandmother always said, 'You can never hate someone once you've heard their stories.''' Kahan has demonstrated the truth of this statement in the high-stress world of knowledge management seminars.

Middle-School Librarian (Raising the Sky to Raise the Scores)

Barbara McBride-Smith is an internationally renowned storyteller and a long-time middle-school librarian in Oklahoma. One of Oklahoma's fifth-grade standardized tests includes questions to assess the students' knowledge of library research and reference materials. One of those multiple-choice questions is typically in the form: ''If you were looking for (some specific fact) would you look in'' and then gives four choices: dictionary, almanac, atlas, or encyclopedia.

Barbara noted that, when the correct answer was atlas, a significant number of students would slip (or panic under test pressure) and mark the other ''a'' word, *almanac*. Without changing any other teaching content or methodology, and without telling them why she was presenting this story, she told the next year's fifth graders the story of Atlas—his struggles with Hercules, how he really had to hold up the *sky* but is always depicted as holding up the *world*, etc.

That year, *not one* fifth grader in the entire school missed the question whose correct answer was ''the atlas.'' Not a single student! When she asked students why they thought everyone got that question right, she received ''Well, duuuuh!'' shrugs and was told that *everyone* knows about Atlas.

Corporate Staff Development (Where Lands' End Begins)

Lands' End created a corporate philosophy: Guaranteed. Period. The challenge was to get all employees both to understand and to adopt this attitude. According to Sandy Johns, Lands' End Learning and Development Manager, they finally settled on a system that worked: stories. Lands' End trainers shared stories about employees who have taken the authority to do whatever is necessary to make customers happy.

According to Jackie Johnson-Gaygill, ''When new employees hear the story of Nora Halverson who sent her husband's cuff links off to a customer because the ordered ones were on back order, they understand the extra effort our people are expected to extend to serve our customers. They learn it more deeply than a lecture or mandate could ever achieve.''

Lands' End has now compiled booklets containing stories that demonstrate how each employee goes the distance for customers. The stories have not only increased commitment to Lands' End philosophy, they have enhanced a sense of belonging, camaraderie, and team building among sales employees.

Primary-Grade Storytelling Program (Changes due to Story)

New Jersey storyteller Susan Danoff is executive director of a nonprofit company providing in-class storytelling programs to inner-city schools. Her programs involve repeat visits to each participating classroom. Over an eight-year period, she collected almost 1,000 Teacher Observation Sheets describing behavioral or academic performance changes the teacher noted that the teacher felt were caused by, and should be credited to, the storytelling program. These sheets covered pre-kindergarten through fifth grade. All comments were qualitative and narrative and only included those effects the teacher felt were sufficient and significant enough to merit mention.

Behaviorally, over 75 percent of preschool teachers and almost half of kindergarten teachers specifically noted that storytelling benefited shy children, making them more willing to participate and volunteer. More than half credited storytelling with increasing attention span or helping students learn to pay attention. Almost half noted that overactive children learned to sit still and listen through storytelling.

Academically, two-thirds of all teachers credited storytelling with improving student comprehension skills (including 88 percent of intermediate grade teachers). Ninety-three percent of kindergarten teachers said that the program improved their students' verbal skills. More than 70 percent of other grade teachers agreed. Half of all teachers (kindergarten and above) believed that storytelling significantly improved student writing skills (including two-thirds of intermediate grade teachers.) More than 75 percent of these same teachers said that the storytelling program improved their students' critical thinking and general imagining and envisioning skills.

These are all anecdotal teacher observations. Yet the consistency and acclaim evident in these results is startling. Their value is enhanced by the fact that teachers know their students best and are in the best position to ascribe improvements to the correct underlying cause. A one-hour, once-a-week (in some cases only once-a-month) storytelling program had a major and lasting impact on student behavior and language arts achievement.

WHAT IT MEANS FOR US

Stories create context and relevance for any included concepts, attitudes, or information and make it easy to recall and use. Want to raise test scores at your school? Pick four questions many students historically miss on standardized tests and develop and tell appropriate stories to create similar context and relevance for that information and watch your school's scores jump accordingly.

Want to develop a sense of belonging and buy-in in your organization? Collect and refine the stories of your group members that best embody the attitudes and outlook you want to promote. Actively tell these stories and encourage others to create and share their own.

The success of these anecdotal applications of story demonstrates the value of stories to more effectively introduce units, themes, and topics. Let the story act as both reference point and as frame for the coming study or learning. Stories create interest, context, and relevance for subsequent information and material. Stories increase learning, interest, and enthusiasm. They make learning fun and

involve story receivers (for example, students, employees, and co-workers) in the material you want to teach.

Stories effectively and efficiently convey factual and conceptual information as well as values, beliefs, and attitudes. Efficiency is an important concept. Many shy away from incorporating stories into already-jammed lesson plans and corporate presentations, believing that stories take more time to deliver the same core information. Yet the unique properties of story structure increase the rate of retention of key program information so that learning per unit time actually *increases*. Story listeners pay better attention.

Stories engage the entire person and evoke a sense of community and of belonging that brings whole people into an event or space. Stories engage multiple aspects of each receiver and allow them to relate to each other on those multiple levels.

THE VALUE OF ANECDOTES

These anecdotes—and thousands more—ring with the power of truth and success behind them. But they are just anecdotes. Perhaps it was merely the enthusiasm of the teacher that made the difference and not the story he or she presented. Perhaps it was their performance skill more than the story content. Perhaps it was just an unusually good class of students and they would have done just fine without the story. Perhaps this particular company with this particular group of employees would have performed as well with some other style of leadership.

Without rigorous control procedures and the use of recognized research methodology, we can never be sure. That's the problem with anecdotes—even with thousands of them.

However, a great mass of individually impressive anecdotes from a variety of fields that all come to the same conclusion, that all demonstrate the same value through stories, cannot be easily dismissed. They may not—even considered collectively—constitute *proof* of the value and power of stories. But they come pretty darned close. If you throw a ball into the air and it falls back to earth, that's interesting. If you throw it up ten times and each time it falls to earth, that's a pattern. It you throw it up 1,000 times and it always falls straight back to earth, you have not rigorously proved the existence of gravity, but you are close enough to serve as a practical guide for virtually all applications. So, too, these massed anecdotes provide clear guidance for how to improve leadership, teaching, and communications in general.

How? Use stories.

CHAPTER 9

WE'VE REACHED THE RESEARCH RESULTS

> *The findings of many hundreds of research studies unanimously confirm the effectiveness of stories for a variety of teaching, leadership, outreach, and communications functions.*

It's time to set personal experience aside and examine analytical research. The studies I present here and their quantitative and qualitative evidence are impressive and convincing. They are powerful, valid, and rigorous. Most have been published through major universities or in peer-reviewed journals. The individuals I reference are all established, respected researchers in their fields.

You should read and understand this research based on the definition of *story* presented in Chapter 7. I chose the research studies in this chapter because I was relatively sure that their use of *story* matched the principles of my definition. I believe that, in all cases, these researchers and their results take *story* in the way we have come to mean it in this book. The reader should overlay these results onto the neural and cognitive research presented in Chapters 3 through 6. The current chapter focuses on research based on the application of story. Yet it meshes well with previous research based on neural function. Combined, they provide a complete and compelling view of the power and potential of stories.

I have grouped the research into eight relevant themes, organized by their effect on the receiver (for example, develop a sense of community and identity *in the receiver*, or improve narrative comprehension skills *in the receiver*). These are:

1. comprehension,
2. logical thinking and general (cross-curriculum) learning,
3. creating meaning from narrative,
4. motivation to learn (and to pay attention),
5. building a sense of community and involvement,
6. literacy and language mastery,

7. writing, and
8. memory.

While each is individually significant, their cumulative significance is, I believe, overwhelming.

For our purposes, the specific scientific field of individual researchers does not matter. Studies from the field of education merge with studies from organizational management and clinical psychology—if they address the same effect in the receiver of the story. That, after all, is the purpose of using stories: to have a desired impact on the receiver.

USING STORIES IMPROVES COMPREHENSION

Reading comprehension refers to the process of interpreting and understanding narrative text (Lehr and Osborn 2005). Pressley (2001) defined comprehension as the ''fluid and integrated articulation of a series of individual processes: processing letters and their sounds, word recognition, spelling, grammar, sentence comprehension, and text processing competencies.''

Only since the mid-1990s has comprehension been a focal issue in reading and language arts instruction (Pressley 2001; Liang and Dole 2006). Before that, the more fundamental skills such as spelling, word recognition, and grammar were emphasized. Cooper (1997) lumped these mechanical skills under the group heading of *decoding* and showed that decoding is a precursor to comprehension.

Do readers comprehend information better and more easily if that information is presented in story form? Does story, as a unique narrative structure, improve reader comprehension? Does a conscious understanding of story architecture improve narrative comprehension?

Researchers who have studied reading and listening comprehension universally—*universally*—support two concepts: first, readers (and listeners) more readily comprehend and retain key narrative information and concepts when they are presented in story form. Second, learning story structure improves comprehension for *all* types of narrative texts—expository as well as story.

> Readers (and listeners) more readily comprehend and retain key narrative information and concepts when they are presented in story form.

First Clymer (1968) and then Cooper (1997) conducted reading assessments using the three levels of Barrett's *Taxonomy of Reading Comprehension*—literal (decode sequence and events), inferential (predict and draw conclusions), and critical (evaluate the text). Both concluded that all three levels of comprehension were facilitated (made easier) when reading *stories* as opposed to other narrative forms. Lehr and Osborn (2005) concluded that stories are far easier for students to understand and comprehend than are expository forms.

Armbruster et al. (1987) used controlled testing methodology to show that students comprehended and retained information about the building of the transcontinental railroad better if the motivations and goals of the builders were made clear and placed in story form.

Trostle (1999) compared storytelling to story reading by measuring both vocabulary development and comprehension. She found that

telling stories to primary-grade students improved their vocabulary faster than did reading to them but that both oral activities significantly improved student reading comprehension. Just *listening* to stories improves reading comprehension!

In her major review of comprehension studies, Maria (1998) said that text structure was one of four elements that determined student comprehension levels. She divided *text* into three categories: basal readers, content area books (expository texts), and children's literature (story books) and concluded that children not only comprehend stories better, but that merely reading literature improved children's general comprehension skills.

In a 1995 survey of 10,000 elementary teachers, 94 percent relied on basal readers for reading instruction (Educational Product Information Exchange 1995). The prime purpose of basal readers is to teach *how* to read. The prime criticism of the basal reading system is its lack of focus on comprehension (Maria 1998, Durkin 1985, Beck et al. 1985, Goodman et al. 1988).

''Because reading programs have centered on the basal reader, children's literature tends to be seen by teachers as recreational reading, 'something to do when your work is done.' Thus, remedial readers have little or no opportunity to read children's literature'' (Maria 1998). She suggested that this lack of opportunity for *story* reading, in part, explained the poor comprehension skills by low-achieving readers.

Supporting Maria's conclusions, Griffey et al. (1988) conducted studies to show that good readers strategize (summarize a text, shift reading pace, ask themselves questions, reread passages, construct mental structure of material, pause to think and consider, etc.) while reading. (See also Baumann 1986, Chan and Cole 1986, Graves 1986, Paris and Myers 1981.) Poor readers are more passive and tend not to intervene with new strategies when they don't comprehend. While reading *stories*, however, poor readers become more active. Reading stories helps them develop the skills and strategies used by good readers (Griffey 1988).

Here, then, are two great story advantages. First, placing information in story form improves reader comprehension of that material, especially for poor readers. Second, reading *stories* develops the skills that improve comprehension of *any* written material.

Smiley et al. (1977) conducted a series of experiments showing that poor readers were also poor listeners and that reading comprehension and listening comprehension depended on the same mental processes. Improvement in comprehension through either activity improved comprehension in both. Further, either activity—listening to stories or reading stories—improved comprehension.

''Stories center on problems in human interactions. Stories in trade books are more popular and comprehensible to students because they have more conflict and more information about the protagonist and the protagonist's point of view'' (Bruce 1990). Bruce, Maria, and Griffey agree that stories contain the structural elements that readers need and want to be engaged by, and to make

Learning story structure improves comprehension for all *types of narrative texts—expository as well as story.*

Placing information in story form improves reader comprehension of that material, especially for poor readers.

Reading stories *develops the skills that improve comprehension of* any *written material.*

sense out of, what they read. Story structure facilitates both comprehension and enjoyment.

In Cooper's study (1997) student comprehension scores were 50 percent higher for information presented in story form than for similar information presented in any of the expository forms he studied. The Texas Education Agency (2002) and the National Reading Panel (2000) also noted significantly higher comprehension scores for material delivered in story form over material delivered in the various expository forms. Data from Smiley et al. (1977) showed that both first-grade and middle-school poor readers, while they struggled with both mechanical decoding and content comprehension for all texts, performed markedly better (comparable to ''good'' readers) when tested on their comprehension of *stories*.

Why Are Stories Better?

If you want students (or people in general) to comprehend new material (concepts, values, factual information), place that information within the context of a story to increase comprehension. Stories effectively teach because people comprehend them better.

But why? Research has focused on three contributing factors:

1. Stories evoke prior knowledge
2. Stories provide details
3. Stories improve comprehension

Use Story to Evoke Prior Knowledge

Prior knowledge refers to accessible banks of information already held in the mind of the reader about any aspect of the material being read. Schema theory holds that comprehension depends on integrating new knowledge into a network of prior knowledge—structural or topical (Harris and Hodges 1995, National Reading Panel 2000).

Relevant banks of prior knowledge include the subject matter of the narrative, personal experience relevant to the processes or situations being described, the characters themselves, and the natural structure of the narrative in which it is being delivered (Pinker 2000, Bransford and Stein 1993). There are many demonstrations that readers who possess rich prior knowledge about the topic of a reading usually understand the reading far better than classmates with low prior knowledge (Anderson and Pearson 1984).

> Prior knowledge of story architecture gained through early childhood story exposure aids comprehension.

Maria (1998) concluded, ''Prior knowledge of the reader is one of the most important factors in comprehension.'' However, as mentioned, there are many types of prior knowledge that can be evoked to aid in comprehension. Studies that have isolated different aspects of prior knowledge have concluded that topical prior knowledge is most useful (Maria 1998).

But evoking other forms of prior knowledge has been shown to benefit comprehension. Cooper (1997) concluded, ''Students generally have more difficulty reading expository texts than story texts because they have had less experience with them.'' After extensive

quantitative testing and after a review of other research, both Armbruster et al. (1987) and Spiro and Taylor (1980) reached a similar conclusion: children (they researched up through seventh grade) have more difficulty reading, comprehending, and recalling expository than story texts because they understand story structure and can access banks of prior story knowledge to know what to expect and to watch for in the text.

Prior knowledge of story architecture gained through early childhood story exposure aids comprehension. Armbruster et al. (1987) further concluded that young children ''learn, internalize, and rely on the elements of story structure when trying to comprehend any texts.''

When studying how people learn from texts about familiar and unfamiliar topics, Bransford and Stein (1993) concluded that the use of familiar story structure aided both interest in and understanding of texts. They stated, ''If you know a lot about a topic, it is much easier to elaborate the new information and remember what you have read or heard.'' However, ''when the topic is unfamiliar, the creator must lead the elaboration process. All are familiar with story structure and with character goal, motive, and struggles. Creators can use these to guide elaboration.'' (Elaboration is the process of activating banks of prior knowledge in order to comprehend.)

Texas Education Agency (2002) concluded, ''Readers who lack sufficient background knowledge of a topic or process typically fail to comprehend and to learn.'' Their term *process* corresponds to understanding the narrative structure used to present the text information.

In their review of effective comprehension strategies, the National Reading Panel (2000) said, ''One effective method of reading about other people, in fiction or social studies (or science, etc.) is to ask students to think of their own experiences and how their lives compare with the life situation of someone that is described in a text.'' This text-to-self-comparison technique evokes prior knowledge of the reader's personal experience and places it in story context (What were you trying to do? How did you feel? What problems did you face?) in order to comprehend new narrative information. The reader's personal experience and familiar story structure combine to create comprehension of the new text. Again, the employment of story structure (this time to format the personal experiences of the reader) enhances comprehension.

> When the topic is unfamiliar, the creator must lead the elaboration process. All are familiar with story structure and with character goal, motive, and struggles. Creators can use these to guide elaboration.

Use Stories to Provide Greater Details That Enhance Comprehension

Many researchers (including but certainly not limited to the National Reading Panel 2000, Cooper 1997, and Pressley 2001) have concluded that additional textural details support improved comprehension of the text. Following his extensive study of comprehension research, Pressley (2001) concluded that one of the four successful strategies for improved memory and comprehension of texts in children was ''constructing mental images representing ideas in the text.'' He and other researchers concluded that text details create these

mental images and that stories facilitate a greater density of sensory details.

Research by Lakoff and Johnson (2003), Bransford and Stein (1993), Pinker (1997 and 2000), and Turner (1996), among other neurological and developmental psychological researchers, confirms Egan's (1997) assertion that mental images allow the transfer of concepts from one mental domain to another. Anderson (1993), Schank (1990), Hardcastle (2003), and others have quantitatively demonstrated what is obvious at a commonsense level: sensory details create images that allow trans-domain neural mapping within the mind of the story receiver.

Tannen (1999) studied factors affecting memory and found ''images created by sensory text details, I am suggesting, are more convincing, easier to comprehend, and more memorable than abstract propositions.'' Story structure provides for increased details that, in turn, create comprehension. She also studied why informal communications create greater retention and recall than do formal (academic) narratives. She showed that the presence of additional sensory details in informal, oral communications increases both interest in, and comprehension of, communication content.

My personal classroom studies have confirmed that readers identify what they read as a *story* and as a *good story* (as opposed to an article, essay, or encyclopedia entry) by the increased density of sensory details and character information. The form and structure of story facilitates the inclusion of essential sensory details and other elements such as rhythm or repetition essential to greater understanding, general learning, and comprehension.

Rule and Wheeler (1993) concluded that effective writers must create a real world for their readers by using densely packed, rich details in addition to information and fact. Foer (2006) studied memory champions and found that they use associative sensory details to enhance natural memory. Sensory details create strong, vivid images that are far easier to remember than factual information alone.

In this way, details create reality in readers' and listeners' minds that increases comprehension. I tell a short story about a girl and a frog and place part of that story on a bridge. If I know enough of the local geography, street names, or store names, for example, I will often claim that the bridge is in the town where I am performing and will add invented details about the history and construction of the bridge to make it seem more vivid. It amazes me how often people come up to me after such a performance and want to talk about that bridge. They discuss it as if it were real. Relevant sensory details have made the fictional bridge real—even for listeners who have lived in the town for many years.

> Readers identify what they read as a *story* and as a *good story* by the increased density of sensory details and character information.

Use Story Structure Instruction to Improve Comprehension

Without exception, and without equivocation, research studies conducted over the past quarter century quantify and praise the ability of story structure instruction to improve comprehension. Period. Literally hundreds of studies have substantiated that conclusion.

This positive effect of instruction on story structure has been well-documented for both good and poor readers and for the comprehension of both stories and expository narratives (Spiegel and Fitzgerald 1986; Buss, Ratcliff, and Irions 1985; Bransford and Stein 1993; Liang and Dole 2006; Snow and Burns 1998; and Griffey et al. 1988). Braun and Gordon (1983) and Morrow (1983) both concluded that knowledge of story structure strongly impacts comprehension.

Greenwald and Rossing compared comprehension scores for a test group of third graders who followed a standard basal program with an experimental group that surrounded the same basal stories with instruction on story structure and the core structural elements of a story. Their work with each group lasted four weeks before final assessment. "The experimental group significantly outperformed the control group on free recall, guided recall, and retelling post tests" (Greenwald and Rossing 1986).

They concluded, "There is ample research evidence to indicate that children's knowledge of the structure of stories is critical to comprehension by providing an organizational framework within which incoming information can be integrated and by providing motivation and encouragement to engage this neural mapping process." This conclusion was supported by studies by Mandler and Johnson (1977); Rumelhart (1975); Stein and Glenn (1979); Dreher and Singer (1980); and Sebesta, Calder, and Cleland (1978).

Without exception research studies conducted over the past quarter century praise the ability of story structure instruction to improve comprehension.

Greenwald and Rossing's experimental group continued to significantly outperform the control group for all comprehension measures five months after the end of training. Long-term comprehension benefits developed from even this short-term instructional program.

In 1987, Armbruster et al. studied eighty-nine students in London and documented over 50 percent improvement in student ability to recall central narrative themes after story structural training. "Students' ability to abstract the content and gist of expository articles was significantly improved by training in story structure." Tested material included both story and expository texts. Brown et al. (1996) reviewed over thirty previous studies and concluded that every study showed statistically significant improvements in comprehension after instruction on story structure.

Short and Ryan (1984) compared fifty-six fourth-grade "less skilled" boys (reading at least two grades below their actual grade) with fourteen "skilled" boys as a control (those who read above grade level). Using detailed post-test free and probed recall, they found that even short-term training (five sessions over three weeks) in story structure elevated the poor readers to actually outperform the good readers!

They concluded, "The present findings support the powerful impact of story grammar training in remediating comprehension failures." The importance of this finding grows more dramatic when you remember that they trained students on story structure, but tested them with both stories and expository narratives.

Children's knowledge of the structure of stories is critical to comprehension.

Griffey (1988), confirming earlier research by Short and Ryan (1984), demonstrated that "the use of story grammar (structural)

training significantly eliminated comprehension failures.'' Poor fourth-grade readers (reading at two or more grades below assigned grade) performed as well on comprehension assessments as skilled fourth graders (reading at one or more grades above assigned grade) following even limited story structure training. Quentin's poor-reading test group correctly answered significantly more post-session teacher-generated multiple choice comprehension questions (average of 18 percent more) than did a control group of skilled readers even though the poor readers correctly answered only one-third as many correctly on similar testing taken *before* story structure training.

Buss, Ratcliff and Irions (1985) divided fifty-two third-grade students into three groups: good readers, poor readers in their test group, and poor readers in a control group. They found that none of the groups showed adequate pretest knowledge of story structure. (Only eight of fifty-two tested as adequate.) Thus, they concluded that the need for story structural training is both great and widespread.

"There does appear to be a direct and significant relationship between knowledge of *story* structure and comprehension of narrative and expository texts."

Tests following a story structural instruction program conducted with the test group showed that the test group now outperformed the good reader group on comprehension texts while the control group of poor readers did not improve and remained almost two grades behind the good readers. Their conclusion: ''There does appear to be a direct and significant relationship between knowledge of story structure and comprehension of narrative and expository texts.''

Liang and Dole (2006) and Snow and Burns (1998) conducted reviews of comprehension literature and strategies for the federal government. Both of these studies placed central emphasis on integrated use of multiple strategies as combined into five instructional frameworks they summarized. All five of these frameworks *assume* that readers possess an awareness of story structure and use that structural awareness as a frame for partner- and teacher-based questioning.

But is that a reasonable assumption? Gillet and Temple (1984) (agreeing with Buss, Ratcliff and Irions) found that students could not consciously describe the elements of a story, even though they easily recognized them and knew their significance for the story.

Similarly, in a small 2003 study I conducted with 550 second- to fourth-grade students in eight schools spread over three states, I found fewer than 10 percent who could articulate the elements of *story* that made them understand the story at the beginning of one of my programs. Eighty percent recognized those key informational elements when they heard them in a story. However, only 45 percent—even with my asking leading questions—were able to articulate what it was that they had just learned. After a one-hour story structural workshop, these three percentages increased to 65 percent, 92 percent, and 73 percent respectively—a most dramatic increase in structural awareness from a one-hour workshop.

Correctly interpreting text structure guides encoding, recall, and reproduction of the essential points of any text (van Dijk and Kintsch

1983 and Armbruster et al. 1987). But middle-grade children have significant difficulty forming and understanding structures for expository text (Brown and Day 1983, Taylor 1986). Story structure study facilitated this task (van Dijk and Kintsch 1983, Taylor 1986). These four studies all concluded that training in *story* structure improved comprehension of *expository* text as well as narrative. Supporting this concept, Bruner (1990) concluded, ''Children produce and comprehend stories long before they are capable of handling the most fundamental Piagetian logical proposition that can be put into linguistic form.''

In his previously cited study, Pressley (2001) said, ''A large number of experiments conducted in the late 1980s and 1990s showed that readers do not automatically relate new factual information to their own prior knowledge. In many cases, more is needed for prior knowledge to be beneficial to reading comprehension.'' One of two techniques he recommended was to make students more familiar with the form and structure of story. In their study of this technique, Brown et al. (1996) concluded, ''The authors were impressed that when researchers used this comprehension strategy with primary-level students, the children benefited greatly from it.''

> Correctly interpreting text structure guides encoding, recall, and reproduction of the essential points of *any* text.

The National Reading Panel (2000) reviewed 481 research studies on comprehension and chose 205 for detailed assessment. This list included seventeen that addressed story structure instruction. They concluded, ''This learning gives the reader knowledge and procedures for deeper understanding of narratives and allows the reader to construct more coherent memory representations of what occurred in the text.''

What It Means for Us

Available comprehension research conclusively shows four things that you can use to improve the efficiency of your teaching and communications.

1. Information delivered in story structure is easier for readers and listeners to comprehend—especially when the topic of information is unfamiliar to the receiver. This improved comprehension relates to the familiar structure, greater inclusion of sensory details in story formats, and story's ability to engage banks of prior topical and structural knowledge in the receiver's mind.

   It may be the *information* you want to communicate, but it's the *story* that creates context and relevance for that information and makes it memorable. It may be an *accomplishment* or final achievement you want to get across, but it's the *story* obstacles and struggles that make it memorable and comprehensible to readers. It may be the *concepts* you want to present, but it's *story* characters and their intentions that give readers reason to care about those concepts.

2. Improving comprehension through the use of story structure also increases information memory and recall.

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3. If you teach the essential elements of story structure to students, their ability to comprehend both story and expository material significantly increases.
4. Time spent reading, writing, and telling stories significantly improves students' ability to read and comprehend all types of texts.

While studying the shortcomings of existing reading programs, Goodman et al. (1988) concluded, ''Basal reader developers ... try to avoid offending anyone, and so may end up offending readers—who just want a good story.''

STORY STRUCTURE IMPROVES LOGICAL THINKING AND GENERAL (CROSS-CURRICULUM) LEARNING

Without doubt, the specific structure of stories aids in reading comprehension. That's valuable. But does the benefit of story extend to math and science? Does it extend across the curriculum and beyond the classroom to the far more general sense of teaching that applies to virtually any communications activity? Does story structure improve logical, mathematical and critical thinking?

After all, the goal of any communications, outreach, or educational program is to communicate in such a way that the reader learns the desired information, concept, attitude, or belief. Several of the anecdotes presented in Chapter 1 and 8 suggest that it does. What does the research say?

Polkinghorne (1988) concluded that ''stories have application and value in science, therapy, history, fiction, natural science, human science, etc. Stories are universal.'' He defined what he meant by universal by saying, ''Story is the primary form by which human experience is made meaningful.''

As early as 1987, the National Council of Teachers of English (NCTE) combined the classroom experiences of literally tens-of-thousands of teachers and concluded,

> "Story is the best vehicle for passing on factual information."

> Story is the best vehicle for passing on factual information. Historical figures and events linger in children's minds when communicated by way of a narrative. The ways of other cultures, both ancient and living, acquire honor in story. The facts about how plants and animals develop, how numbers work, or how government policy influences history—any topic for that matter—can be incorporated into story form and made more memorable. (NCTE 1992)

In a particularly interesting and innovative bit of research, O'Neill, Pearce, and Pick (2004) studied the storytelling ability of preschool students in Ontario, Canada, and found good correlation between early storytelling activity and later math abilities. They suggested that time spent on early storytelling skill development (telling and reading stories to children and allowing them to tell) in preschool years seems to improve math skill upon entering school. More important,

this study clearly establishes storytelling skill (structural knowledge and story thinking) as both predating, and as precursor to, logical thinking and critical thinking development.

The human ability to learn through story begins virtually at birth. Miller (1989) showed that two-year-olds are better able to verbalize about, discuss, create sequential discussion of, and tell feelings of past events when they structure those events into classic story form. They include five times as many evaluation devices in stories as in other speech.

The superior ability of humans to learn through stories also extends into adulthood and throughout the expanse of learning situations and subjects. Coles (1989) compiled eighteen years of testing data for his college students on the effect of teaching through literature. He focused on the effect of classic stories on the learning of students in the technical, science/math fields of law, business, and medical classes. Coles concluded that stories enhanced recall, retention, application of concepts into new situations, understanding, and learner enthusiasm for the subject matter. ''Stories enhanced and accelerated virtually every measurable aspect of learning.''

Coles attributed this broad-spectrum academic benefit to the structure of stories. ''Stories provide an additional kind of truth besides scientific fact. This is character truth that creates context, relevance, and empathy for both factual information and for struggles of each character.'' Characters represent surrogate models for the reader and allow the reader to interpret and understand text content. The meaning for facts, data, or concepts does not come from those facts alone. Rather it comes through characters and requires story elements (for example, intention, struggle, conflicts, and reaction) in order to be understood by readers.

> Storytelling skill both predates, and is a precursor to, logical thinking and critical thinking development.

Trousdale (1990) demonstrated that story structure provides a successful framework to allow children to structure, understand, and create meaning from sequential events. Similarly, Meyer (1995) argued that exposure to story structure allows students to make sense of experience—any experience—physical or narrative.

Both Ragan and Wittenberg-Lyles (2005) and Greenhalgh and Hurwitz (1999) concluded from their research that the very nature of narrative makes it a ''prime instrument for all general learning.''

Schank (1990) claimed that ''storytelling has demonstrable, measurable value in all teaching.'' Both he and Dalkir and Wiseman (2004) concluded that stories are markedly effective for communicating factual, conceptual, and tangible information and that story is a superior vehicle for communicating tacit information and knowledge. Dalkir and Wiseman (2004) defined tacit knowledge as ''that which is difficult to articulate, to render tangible in some form'' (for example, values, beliefs, attitudes, or cultural norms).

According to the organizational studies of Sole and Wilson (2004), stories enable ''knowledge-sharing experience and accelerate the transfer of tacit knowledge.'' They concluded that stories are good candidates for promoting knowledge movement, and place no limits on the kinds of knowledge that their research suggests stories can ''transfer.''

> Research confirms the effectiveness of story structure as a vehicle to teach social relationships and values.

After research on student learning patterns, Taylor (2001) concluded, ''Story [telling] is a valuable resource for developing critical thinking skills and insight about cultural environment that transmits beliefs and values.'' His research suggested that abstract concepts and information are best understood through the structure of stories.

In her study of the form and structure of effective formal and informal communications, Mehl-Madrona (2005) concluded, ''The telling and retelling of stories is the powerful means by which cultures of families and communities are formed and maintained, national identities are preserved, problem-solving skills are taught, and moral values are instilled. Stories get our attention and teach us things we will never forget.''

Storyteller Donald Davis (1982) conducted a small experiment from 1980 to 1982. Each Friday afternoon he collected fifteen fourth- and fifth-grade students from a Charlotte, North Carolina, school and told them stories. His goal was to see if, just by listening to stories, they would internalize the structure, pattern, and organization of effective stories. Far beyond confirming their improved ability to understand, predict, and construct effective narratives, Davis found that these underachieving students were ''able to organize their work better in study areas far removed from storytelling'' (Davis 1982). The grades of these students in core academic subjects advanced over the course of that year far ahead of their peers who were not part of the storytelling experiment.

Davis's experiment did not constitute a formally organized research project and, so, we cannot use these results alone to conclusively prove the noted, broad-based student advancement was solely attributable to storytelling activity—even though the teachers involved in this program believed that it was. However, using more established research techniques, Peck (1989) and Moss and Stott (1986) similarly concluded that children who hear stories develop a sense of story structure and flow that facilitates all types of academic learning.

Clandinin and Connelly (2000) evaluated story in light of the six levels of Bloom's *Taxonomy* (knowledge, comprehension, application, analysis, synthesis, and evaluation). They concluded that ''story structure facilitates all six by providing context and relevance as well as information.''

The Effect of Story Structure on Learning

Several researchers have wondered why story and storytelling are more effective vehicles for learning and teaching and have looked at the effect not of story content, but at the effect of the structure, itself.

Egan (1997) conducted decades of study and research into how young children learn. Children, Egan concluded, are evolutionarily hardwired and programmed to respond to story structure first. This dominance of story thinking is then reinforced over the early years as it is successfully used over and over again. Egan showed that this theory matched what he observationally documented in his in-class studies.

Egan identified six elements that define how children learn new material. All six are primary characteristics of story structure and have been confirmed by many other famed researchers and practitioners including Levi-Strauss (1978), Brown (1991), Turner (1996), Winner (1988), Quine (1989), Paley (1990 and 2002), Opie and Opie (1985), Lakoff and Johnson (2003), and Pinker (1997).

Egan (1997) states, ''Narrative (stories) are accessible to the literate and illiterate alike, to the logico-mathematically sophisticated and unsophisticated. We might well develop a respect for narrative as everybody's rock-bottom capacity, but also as a universal gift, to be shared with others.'' He concludes by stating, ''Once we recognize story structure as a prominent feature of human understanding, then we are led to reconceive the curriculum as the set of great stories we have to tell children and recognize elementary school teachers as the storytellers of our culture.''

Brown (1991) showed that ''young children universally understand and delight in fantasy stories. They are clearly able to integrate nature and culture in that story space and readily accept clothed and talking rabbits without expecting story elements to translate back into their real world.'' Through the fantasy ''reality'' of story, children learn and understand complex concepts they cannot grasp through logical, factual, or argumentative presentations.

Egan (1997) states that ''oral cultures discovered long ago that ideas and values put into rhythmic story form were more easily remembered and more accurately acted upon.'' This contention has been supported by extensive studies, and reviews of studies, by other researchers such as Paley (2002, 1984, 1990), Opie and Opie (1985), Tannen (1999), or Sutton-Smith (1981). Rhythm is a communications concept completely compatible with story, but not with other common expository forms.

Story structure proved equally more effective for teaching theorems, facts, concepts, and tacit information all across the curriculum and the spectrum of human communications.

Chafe (1982, 1985) compared effective learning from conversational storytelling and formal academic papers and found that material presented in story structure (providing a central role for character, goal-directed activity, and a greater density of sensory details) was learned more efficiently and effectively than the same information presented through traditional academic writing. Tannen (1999) conducted a similar study and produced identical results. So did Ochs (1979) and Scollon and Scollon (1984).

In each of these studies, researchers assessed the effect of converting information into story structure without regard for, or limit to, the specific type of information being taught. Story structure proved equally more effective for teaching theorems, facts, concepts, and tacit information all across the curriculum and the spectrum of human communications.

Chafe, Tannen, and Scollon and Scollon all noted that readers are drawn to and become involved with narrative presented in a specific form and are turned off by narrative presented in specific other forms. The former corresponds to effective story structure; the latter to typical expository and academic styles. Tannen expressed it well. ''Short stories combine the 'involvement' that Chafe finds typical of

conversation with the 'integration' he finds typical of expository writing. The result is far more successful than are other forms of writing.''

Outside the Classroom

Learning is certainly not limited to the classroom. All communication is, at its root, an attempt to motivate, to persuade, and to teach. Many large-scale and detailed business and organization management studies have assessed the potential for stories as communications, teaching, and learning vehicles in organizations. All have confirmed that stories are uniquely adept at the role of organizational communications and teaching.

Patton (2002) studied communications patterns in over 100 organizations. Boyce (1996) reviewed 125 other quantitative studies of story use in organizations. Czarniawska (1997) studied the use of story in dozens of international corporations. These and dozens of other studies all concluded that stories are a uniquely effective form of organizational training and communications.

Martin et al. (1983) showed that key organizational information is most successfully communicated through stories. Stories define and direct the personality, culture, and direction of an organization.

Fisher (1987) defined his ''narrative (story) paradigm'' for organizational communication as the bedrock of effective organizational communication and said that ''stories give reasons which provide coherence and order to events occurring.'' Studies by Boje (1991), Crossley (2000), and others have confirmed both the superiority of and extensive use of Fisher's paradigm.

Denning (2001), Armstrong (1999), and others have written extensively to detail the success they have experienced after converting their organizational training and communications into story form.

Denning (2001) concluded that springboard stories were essential to organizational redirection, management, and cohesiveness. He proposed the following three elements as uniquely identifying such springboard stories:

> These and dozens of other studies all concluded that stories are a uniquely effective form of organizational training and communications.

1. **Connectedness.** Make listener instantly *empathize*; make them feel connected.
2. **Strangeness.** The story must violate the listener's expectations in some way. (Psychological development theory says we don't pay attention to what we expect to see.)
3. **Comprehensibility.** The story must create context that has direct relevance to the listener.

The conclusions of each of these studies show that stories are an essential and inseparable part of successful organization existence. The question is never ''Do organizations need stories?'' or even ''Do stories play an important role in organizations?'' any more than ''Do humans breathe?'' is a reasonable question. They do. Period. The question of concern in these studies is: do organizations *consciously*

understand, use, and control the stories that define their beliefs, attitudes, decisions, and actions?

Stories Are How Humans Perceive, Think, and Learn

More than just being a uniquely effective learning, teaching, and communications tool, a number of studies have extended their research to show that the reason behind this unique effectiveness is that stories match how humans naturally perceive, process, think, and learn.

Organizations are built of people and stories resonate with people. In supporting research by Sarbin (1986), Crossley (2000) said, ''... human beings think, perceive, imagine, interact and make moral choices according to narrative story structures.''

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Bruner (2003) said, ''Why do we use story as the form for telling about what happens in life and in our own lives? Because, most often, life follows story form and format. We use it because it usually works.'' He concluded, ''Story, including fictional stories, gives shape to things in the real world and often bestows on them a title to reality.... It is the sense of things often derived from stories that makes real-life references possible.''

Similarly, Drew (2005) said, ''Stories provide a template for character and self-development and they also provide a model through which to approach life.'' Organizations, then, rely on story (consciously or unconsciously) because people (consciously or unconsciously) rely on stories.

But the value of story is not limited to education and organization management. While focusing their study on successful trends in clinical therapy, Fireman et al. (2003) concluded, ''The concept of story has been called 'one of the most prominent currents in late 20th Century life.''' Neisser and Fivush (1994) reached the same conclusion.

> Fireman et al. (2003) concluded, ''The concept of story has been called 'one of the most prominent currents in late 20th Century life.'''

Harter et al. (2005) reviewed forty other studies (many, themselves, reviews of other studies) assessing the use of story in therapy. Most of these forty were quantitative assessments. Harter et al. concluded, ''There has been a rush to narrative therapy and to use of narrative theory in healing because study after study and in anecdotal evidence after evidence universally confirm forty stories work. No contradictory study was sighted or identified in writings by forty professionals citing hundreds of other studies.'' Further, they reported that all forty studies asserted that ''stories facilitate emergent social selves, relational identities, and co-cultural understanding.''

Thus, the use of story structure as a way to organize and present material is more effective simply because it matches the way that humans naturally think and perceive. Humans learn better *through* stories because story structure is how human minds naturally seek, process, and understand new information. ''Every one of us is actively plotting our lives, both consciously and unconsciously, by attempting to construct ourselves as significant characters within what we regard as meaningful life stories'' (Johnson 1996).

What It Means for Us

Research clearly supports and substantiates two important concepts for education:

1. Any curriculum information will be learned better and more effectively if presented within the context of story structure.
2. Involving students early and often with stories (storytelling, story listening, story reading, story writing) improves logical thinking and mathematical thinking.

Research also clearly shows that teaching outside the classroom of factual, conceptual, and tacit information is more effectively and efficiently conducted through material formed into story structure. Story—that particular narrative structure—matches the way human minds naturally think and process information and improves all modes of human thinking.

We humans live, think, and learn through stories.

USING STORY AND STORY STRUCTURE ENHANCES MEANING

The goal of every reader and listener is to create *meaning* from what they read and hear; to make it make *sense*. Meaning is a close companion of comprehension. The reason to comprehend is to then create meaning. Meaning almost automatically follows after comprehension. Is there research that addresses the effect of story and story structure on the creation of *meaning*? Actually, there is a great deal of it.

Crossley (2000) addressed the question of meaning, itself. ''When we ask, 'What does this mean?' we are asking how something is related or connected to something or someone else. It is the connections or relationships among events that constitute their meaning.'' Readers, then, seek a context within their own banks of experience within which this new information is relevant to them. This mental search is controlled by neural maps, chief among them is the reader's/listener's story map.

Lehr and Osborn (2005) said, ''. . . meaning resides in the thinking processes that readers engage in as they read. The meaning they get from their reading is influenced both by their relevant prior knowledge and experiences and by the neural schema engaged to organize that particular text.'' Meaning, then, arrives from a process of comparison, interpretation, and mental filtering controlled by story schema and by banks of relevant personal experience and prior knowledge.

Creating Meaning in the Classroom

In her well-known books describing her kindergarten experiences, Paley (1990 and 2002) writes compellingly and eloquently to demonstrate that children process the world in story terms, using story as a structure within which to create meaning and understanding. She

observes that science facts, theorems, and information gain meaning for students only when students can place that information within the context and relevance provided by story structure and prior story information.

Blythe et al. (2004) reviewed existing literature to examine the effectiveness of story as an educational tool. They concluded that the primary benefit of stories in education is that they create meaning (make sense) even from apparently chaotic and random events or bits of information. Boje (1991) agreed when he concluded that story allows participants to bring order to complex situations and to ''create meaning from seeming disconnectedness.''

> "Science *is* a form of storytelling. Science meaning is constructed and conveyed through storytelling."

Creating Meaning Outside the Classroom

Most educational research, however, has focused on comprehension. Conversely, meaning is the central focus of related research in the fields of organizational management, narrative therapy, and psychology research.

Hastings et al. (2005) and Drew (2005) both analyzed different narrative data sets related to the stories used for, and created as part of, the patient healing process. While each analyzed the narrative content in quantified detail, an overriding truth of their research is that *all* patients viewed their situation as, and constructed their narrative as, stories. The information extracted and feelings experienced could have been expressed (structured) in a wide variety of frameworks. Yet all—without conscious thought—created narratives in classic story architecture in order to create meaning from their therapy. Hastings et al. concluded that ''narrative (structure) moves readers and listeners toward reconstructing meaning.''

Hanninen (1999) also studied the use and effectiveness of narrative therapy and found that ''patients were unable to promote self-recovery until they were able to structure a successful narrative of their addiction (including positive resolution). Successful narratives were essential in order to give meaning to patient struggles.'' She stated that *every* patient narrative and case she studied formed their story with a protagonist, goal, motive, conflicts, risk and danger, struggles, and resolution.

> "Patients were unable to promote self-recovery until they were able to structure a successful narrative of their addiction (including positive resolution). Successful narratives were essential in order to give meaning to patient struggles."

In her review of over 100 other studies, Mehl-Madrona (2005) agreed, concluding that ''stories and storytellers help people make meaning in their lives.'' She further stated, ''Narrative psychotherapy says that our stories contain the meaning we make of our experiences. Stories hold a richness and complexity that simple declarative facts can never grasp. . . . Story provides the dominant frame for organizing experience and for creating meaning out of experience.'' She concluded that ''stories rather than logical arguments or lawful formulations, are the vehicles by which that meaning is communicated.''

> "Stories rather than logical arguments or lawful formulations, are the vehicles by which that meaning is communicated."

Many other studies in the fields of psychotherapy and narrative therapy have arrived at the same conclusion. Hirst (2001) stated that ''stories reveal causes and consequences that form the foundation of meaning.'' Spicer (1998) said, ''Narrative fulfills critical sense-making

function.'' Spicer's work led her to the conclusion that ''if you can't see the story; you won't learn the content and its meaning.''

In a more broadly focused study of narrative, Howard (1991) claimed that ''when we think, we do so by fitting story themes to the experience we wish to understand. . . . A life becomes meaningful when one sees himself or herself as an actor within the context of a story.''

Swatton (1999) cited numerous studies to support her contention that ''stories communicate meaning,'' and that ''healing stories create meaning within the context of struggle.'' She concluded that ''we cannot change ourselves until we change our stories.''

Hastings et al. (2005) conducted a statistical analysis of story themes and content for grieving stories. Setting aside the details of this content analysis, the broader point was that all of the patients that were studied organized thoughts automatically along story elemental lines when asked to identify any aspect of meaning. For these patients, meaning came from and through story structure. Ryden (2005) conducted a similar, but qualitative analysis of bereavement stories and reached an identical conclusion on the role and function of story.

Drew (2005), in supporting earlier work by Somers (1994), stated, ''People make sense of what has happened and is happening . . . by attempting to assemble or to integrate these happenings into narratives (stories).'' Babrow et al. (2005) concluded, ''Stories provide a way to make sense of experience. Stories provide particularly important ways of understanding when unexpected, unpleasant, or uncertain experiences challenge what had previously been taken for granted.''

All **of the cited studies confirm the cognitive value and meaning enhancement of stories.**

Harter et al. (2005) cited literally hundreds of other studies in their assessment of stories and concluded that *all* of the cited studies confirm the cognitive value and meaning enhancement of stories. The authors described stories as ''occasions for the act of knowledge and meaning sharing.''

In the most comprehensive and critical review of organizational myths to that date, Bowles (1989) examined the relationship between myth and meaning in work organizations. His conclusion: meaning is now sought by many people through their work and work organization and is defined by the organization's dominant stories and myths.

Behind Boyce's (1996) narrative study of *how* stories develop and affect (even control) life and work, Boyce showed the more basic truth *that* stories (story structure and form) are the most basic form used to filter, internalize, make sense of, and evaluate new experiences and information both for individuals and for organizations. In all the studies and organizational examples Boyce studied, the researchers had to place collected data within the context and structure of a story in order to create meaning and to make sense of organizational communications.

Boyce (1996), Nusbaum (1982), and Boje (2001) arrived at identical conclusions. ''Meaning and sense-making come for viewing organizational communications in the form and structure of corporate stories

and myths'' (Boje 2001). ''Sense making in organizations must involve stories and storytelling'' (Boyce 1996).

Beginning with his experiences at the World Bank, Denning (2001) studied the use of, and potential for, stories in organizational management. He concluded, ''Stories help us understand complexity. Stories can enhance or change perception. Stories are easy to remember.''

Arriving at similar conclusions, Stone (1996), in agreeing with Weick and Browning (1986), said, ''Storytelling brings people together in a common perspective, and stretches everyone's ability to empathize with others.'' Extending his analytical studies to a personal observation, Denning (2001) said, ''As opposed to logical step-by-step explanations, I can follow stories with pleasure and with no effort at all. I instantly perceive the meaning behind the story.''

Famed narratology researcher Polkinghorne stated as the central theme of his (1988) book, ''The core argument that I make in this book is that narrative is a scheme by means of which human beings give meaning to their experiences of temporality and personal action. Narrative is the primary form by which human experience is made meaningful.'' Another researcher from the same field, Heidegger (1971) argued that ''narrative is the primary scheme by means of which hermeneutical (interpretive) meaningfulness is manifested.''

> "Narrative is the primary form by which human experience is made meaningful."

Story is the structure by and through which humans create meaning. McAdams, a psychologist, wrote in his 1993 book, ''It is because of the narrative nature of human minds that we are impelled as adults to make sense of our lives in terms of stories.'' In 1999, Swatton stated, ''Stories (structure of) are integral to the ability to have information and experience make sense to our lives.'' Kaminsky (1996) wrote, ''To make sense of the world, people tend to structure the stream of time and events into traditional story elements. It is a way to create meaning from past events, a way to understand the present as an outcome of the past.''

Famed psychologist, Jerome Bruner (1990) concluded, ''It is narrative and narrative interpretation upon which folk psychology depends for achieving meaning. Stories achieve their meanings by explicating deviations from the ordinary in a comprehensible form.'' His is yet another voice saying that we humans must weave information and experience into story structure in order to obtain meaning. In 1987, Bruner stated, ''Other temporal forms (than story) can be imposed on the experience of time, but none of them succeed in capturing the sense of, or giving meaning to, lived time: not clock or calendar time forms, not serial or cyclical orders, not any of these.'' In the same paper, Bruner concluded from his decades of research and clinical observation, ''I believe that the ways of storytelling and the ways of conceptualizing that go with them become so habitual that they finally become recipes for structuring experience itself, for laying down routes into memory, for not only guiding the life narrative up to the present but directing it into the future.''

What It Means for Us

The point of teaching—of communications in general—is to instill a desired meaning within the mind of the receiver. As was true for comprehension, as will be true for other communications activities, the use of story structure facilitates and enhances the creation of meaning. More importantly, since meaning is the process of creation within the mind of the receiver, your use of story structure better insures that the meaning created by the receiver will more closely match the meaning you intended to create.

Perhaps the dominant role of story structure as a vehicle to create and to communicate meaning emanates from, in Bruner's words, ''narrative imitates life because life imitates narrative'' (Bruner 1987). Or perhaps, it is simply, as Herndon (1995) concluded, ''Stories bring evidence to life.'' And that, after all, is the essence of meaning.

STORIES CREATE MOTIVATION AND ENTHUSIASM FOR LEARNING

Advocates claim that stories motivate readers and listeners to learn, that stories create enthusiasm and a sense of belonging and community. Certainly, that was the experience of high-school teachers Dan Fossler and David Crenshaw and lecturer Seth Kahan. Has more thorough research found the same?

Holt (1983) showed that ''interestingly, but not surprisingly, the things we learn because, *for our own reasons*, we really need to know them, we don't forget'' (emphasis added). Readers must create context and relevance in order to believe that they have reason to learn. They need to see that the information fits within the context of some bank of existing information and that the information is relevant to some topic of significance to them.

> ''Interestingly, but not surprisingly, the things we learn because, *for our own reasons*, we really need to know them, we don't forget.''

Holt and others (Chafe 1985, Pinker 2000, Bruner 1990, Stone 1996, among others) have shown both that story structure helps readers invoke existing banks of knowledge to increase context and that story structure increases relevance for new information in unfamiliar topics. Finally, these same researchers have shown that stories create empathy that makes readers feel a greater personal involvement with the story and increases the degree to which readers want to learn.

Maria (1998) substantiated previous research showing that when students read because they *wanted* to read, they learned reading-related skills faster than when reading assigned texts.

Maria examined what children voluntarily read and concluded that children would only recreationally engage in reading if they had some recognized purpose for that reading. ''Recreational reading improves the reading achievement and attitude toward reading of remedial low readers and middle-class average readers'' (Maria 1998). Maria confirmed that ''research shows that the vast majority of recreational reading involves reading of fiction and nonfiction *stories*'' (emphasis added). Voluntary reading happens only after context and relevance for the process and for the narrative have been established.

Stories naturally create context and relevance more readily than other narrative forms.

Pressley (2001) and Pressley and Afflerbach (1995) came to a similar conclusion. ''Good readers are aware of *why* they are reading a text'' (Pressley 2001).

So did Short and Ryan (1984): ''If readers lack awareness of the purposes and goals of reading, then they should not be expected to employ successful strategic attempts to meet the demands of the task.'' Brown (1980), Paris et al. (2000), and Smiley et al. (1977) reached similar conclusions from their research.

Shuman (2006) reported on her research that has linked story with the creation of empathy in readers. (She defines empathy as people's understanding, through narrative, of experiences they do not share and characters they do not know.)

Using the well-known ''Welcome to Holland'' story with parents of disabled children, Shuman (2006) was able to show that parable and allegory uniquely create empathy. ''Parable says things that cannot be said or are not said'' and ''Parable and allegory can create sentimental identification with goal, struggles, and emotions of the story character'' (Shuman 2006). Her clinical work confirmed that empathy changed patient attitudes and motivated them to learn and adapt.

Approaching learning motivation from the reverse perspective, Howard (1991) tried to assess why people resist reading, and are less able to remember, scientific journal articles. ''The scientific style (of writing structure) is the inferior in many ways because of the enormous number of limitations by which it is encumbered.'' Chief among the limitations he identified were a lack of character development, the use of passive voice, distant third-person perspective, and the omission of key character-related information (goal, motive, struggle). He concluded that these limitations prevented personal involvement by most readers and made it far more difficult for them to create personal context and relevance. As a result, all but those who truly needed the information were unmotivated to read.

> ''Good readers are aware of *why* they are reading a text.''

What It Means for Us

It is certainly not news that students who want to learn *do* learn. Placing key concepts and information within the structure of stories provides motivation to absorb and learn material by creating context and relevance more efficiently than other narrative forms.

If you use stories to create context and relevance for new lesson blocks and begin to introduce unfamiliar topics through story, research confirms that you will increase both learning and interest in the topic.

STORIES CREATE INVOLVEMENT AND A SENSE OF COMMUNITY

Studies in the fields of organizational management and knowledge management have addressed the potential of using stories as tools to create a sense of belonging—of community—within an organization.

Their findings are as valid and valuable in the classroom as in the boardroom.

Case Studies

Most of the available research amounts to compilations of trial-and-error anecdotal studies. Formal research techniques using control groups and ''double blind'' protocols are not possible within the high-pressure, demanding, results-oriented, bottom-line world of business management. However, the consistency of the case study findings (often including comparative analysis within a single organization before and after using story-based approaches) provides a clear statement of the effective role of story within organizational leadership and management.

One of the first to eloquently espouse the value of storytelling to corporate management was Armstrong (1999) with his book *Managing by Storying Around: A New Method of Leadership*. Through his personal story and storytelling experiments with his own employees he found that structuring his themes and messages in story form significantly increased worker involvement, sense of commitment, ownership of corporate values and mission, and sense of belonging—of ''family.'' He also found that storytelling was far more effective at successfully motivating employees to buy into corporate values, policies, and attitude.

Denning (2001) found similar results in his story experiments at the World Bank.

> I found that a certain sort of story ... communicates complicated change ideas while generating momentum toward rapid implementation. Storytelling gets inside the minds of the individuals who collectively make up the organization and affects how they think, worry, wonder, agonize, and dream about themselves—and in the process create—and re-create—their organization.

Further, he concluded from his own experiments with presentations, ''Time after time, when faced with the task of persuading a group of managers or front-line staff in a large organization to get enthusiastic about a major change, storytelling was the only thing that worked.''

Denning (2001) further reported, ''When I use the Zambia story [one of his stories] in this way, people are able to understand the idea of knowledge sharing. . . . When I don't use the Zambia story, I find that the conversation often ends up in a tangle of debates about various aspects of the feasibility of the change idea.'' The story framed and directed the conversation. It defined what would be relevant and created a common perspective through which all viewed the concepts and discussions. It created a common attitude and context that (because of the relevance of the story) all accepted. That is the effect of stories.

The recent publication by the National Storytelling Network (*Wake Me Up When the Data Is Over*—Silverman 2006) includes over 250 examples of the use of story for organizational management scattered

The more central and important a concept is to the organization, the more it tends to form and grow organically into story.

through chapters written by fourteen authors. Most of these examples concentrate on using story to build a sense of community and pride in organization members and on efforts to motivate them to adopt a common set of beliefs, values, and perspectives. The following are several typical examples presented in that book.

As mentioned in Chapter 8, Lands' End has collected and published booklets of stories of the experiences of employees for new employees to model (Lands' End 2000). Originally designed to foster improved customer service, Lands' End management found that the stories have actually created a feeling of community and pride within the company that far exceeds the originally intended value of the stories.

Similarly, Tracey Briggs reported that her Orlando Regional Healthcare facility began a story-sharing program to motivate team members toward excellence in patient care. They found that stories shared during staff meetings and staff trainings actually created strong bonds between nursing staff teams and a feeling of pride in being part of this regional medical community. What followed was the adoption of common team values and attitudes that, in turn, precipitated improved patient care.

Motorola's vice president for human resources and organizational development trains managers in storytelling because they have found that storytelling is ''fun and more effective at establishing corporate direction and identity.'' The California Department of Social Services sends managers to storytelling workshops because they have found that stories more effectively ''establish rapport and trust, coach employees, deal with adversity, empower people, solve problems, and catalyze change.'' The Goizueta Business School president said that storytelling was the first effective way he had found to create class identities, unity, and involvement—and it worked extremely well with each new class.

The common thread in each of these case studies is that an organization found that stories were more effective than what they had been using to accomplish essential internal community building, to create a sense of involvement, and to instill organizational attitudes, beliefs, and perspectives in organization members.

Analytical Studies

Other, more rigorous studies have compared the workings of a variety of organizations to assess the effective role of stories within structured organizations. Snowden studied internal corporate communication and found that the more central and important a concept was to the organization, the more it tended to form and grow organically into story. ''In organizations: stories are uniquely effective as research tools, managerial tools, internal and external communications tools, organizational analysis tools, motivation and identity tools'' (Snowden 2000).

Wilkins and Martin (1979), Gabriel (2000), Weick and Browning (1986), Stone (1996), Bowles (1989), and others have studied the use of stories for organizational management and all have concluded that

> The primary functions of stories are to provide motivation, a sense of belonging, a personal commitment to the organization, and a feeling of community.

the primary functions of stories were to provide motivation, a sense of belonging, a personal commitment to the organization, and a feeling of community. Further, they each conclude that stories were uniquely effective at fulfilling these organizational functions.

Boyce (1996) conducted an extensive review of more than 125 other research studies on organizational use of story and storytelling and found,

> Stories create a sense of community, effectively share values and attitudes, build camaraderie, build culture, promote interaction, communicate management priorities and philosophy, share knowledge and information, etc. Research explicitly shows that, within organizations: stories are useful for new member socialization and generating commitment; stories are an effective vehicle for social control; stories provide and define meaning within the organization culture and structure; and familiarity with dominant organizational stories is an indicator of adaptation.

Weick and Browning (1986) and Stone (1996) concluded that storytelling brings people together in a common perspective and stretches everyone's ability to empathize with others. These researchers confirmed the power of story to motivate readers and listeners to pay attention and to internalize and adopt the content being communicated. Gabriel (2000) arrived at an identical conclusion.

Bowles (1989), in agreeing with earlier work by Sievers (1986), showed that stories increased team success and team identification. Wilkins and Martin (1979) identified three functions stories served most effectively in organizations: generating commitment (behavioral and attitudinal), making sense of the organization, and managerial control. "Stories serve these vital functions in an organization more effectively than other communications devices."

Similar importance for, and value in, story has been identified in clinical therapy research. Examples of this research were included in previous sections. As an additional example, Harter et al. (2005) cites forty studies of the use of story (narrative) in the field of clinical therapy. Many of these studies, themselves, included reviews of other studies and most provided quantitative evaluation of the effectiveness of story. Harter reported that all of the studies they examined assert that narratives were successful and effective in structuring and framing therapy ("... stories were particularly valuable as mundane and extraordinary ritual symbolic forms, as sites for action and agency, and as occasions for the act of knowledge sharing").

Harter et al. (2005) further stated that "narrative as representation has long been respected as an optimal vehicle for teaching pre-established truths. ... Understanding the epistemological and ontological power of narrative is a vital direction for health communication researchers to pursue."

Stories increased team success and team identification.

What It Means for Us

It is clear that stories and storytelling effectively communicate facts, concepts, beliefs, values, and other tacit knowledge. Part of this

success stems from story's unique ability to motivate readers and listeners to pay greater attention while they read and listen and to involve story receivers with the characters and struggles of a story. Stories create a common perspective and context that makes content information personal and relevant.

In this way, stories connect each receiver to others, form bonds, create common identity and purpose, and encourage people to adopt the values, ideas, perspectives, and attitudes of story characters. These elements, in turn, build a feeling of involvement and a sense of community.

If you want your messages adopted by, and internalized into, those in your organizations, find or create an effective story (or a series of stories) to share with them that incorporates your core information into the characters and struggles of the story. Encourage employees to share their own stories and experiences. Build a set of common stories that reflect the values, attitudes, struggles, beliefs, and accomplishments of the community you want to create. Let these stories create the personal involvement that will cause each individual to personally adopt the community.

STORY STRUCTURE IMPROVES LITERACY AND LANGUAGE MASTERY

I will now turn back to matters more tightly focused on the relationship between story structure and language arts teaching. How do stories and story structure affect measures (other than comprehension) of language proficiency?

Story is the root form of all narratives. Story predates logical thinking and argument, writing and exposition, and informative and persuasive structures by tens-of-thousands of years. They are each branches of narrative developed from the root of story. Every culture, tribe, and nation has developed stories. They have used and preserved stories. Not so for writing or for logical and expository forms. Story always comes first.

It would therefore make sense that general literacy is enhanced by using and teaching story and story structure. Does research support this view? Maria (1998) reviewed a number of studies and theories for how to measure and assess readability as a measure of literacy. Most readability formulas rely on word and sentence length. However, such formulas ignore the existence of story schema (structural maps) in readers' minds. When material is presented in accordance with those common story structures, readability and comprehension both increase (Maria 1998). Story structure allows readers to better visualize context and to correctly anticipate upcoming verbiage, thus increasing readability.

Many consider literacy to be the sum of a set of individual language-related skills: vocabulary, spelling, the ability to write, sentence structure and fluency, and others. Cooper (1997) takes a broader and more practical slant for his definition. ''Given what we have learned, we must view literacy as the ability to communicate in

All studies concluded that storytelling enhanced literacy.

real-world situations, which involves the abilities of individuals to read, write, speak, listen, view, and think.''

Does story structure influence language fluency in that broader sense?

Mello (2001A) reported on ten studies of elementary–school students. Each study included pre- and post-interviews and writing sample analysis. All studies concluded that storytelling enhanced literacy. She concluded, ''Stories are an effective learning tool that linked literature to content and experience.'' Mello found that story form acted as a bridge to merge student experience into their understanding of content information and literature. She stated that storytelling creates empathy in listeners for both the storyteller and for the story's main character and that this empathy increased both interest in, and understanding of, the story content. Her conclusion was: ''Humans are linguistically rich natural storytellers.''

Snow and Burns (1998) concluded their study by saying, ''Recently the efficacy of early reading and story exposure has been scientifically validated. It has been shown to work [to develop language skills].''

> ''Recently the efficacy of early reading and story exposure has been scientifically validated. It has been shown to work [to develop language skills].''

In a detailed and quantitative 1999 study, Trostle established that, while both showed strong positive effect, storytelling was superior to story reading for student vocabulary development and for comprehension. Most important for our purposes, Trostle's work supports the contention that exposure to story structure improves literacy.

Peck (1989) concluded that ''children who hear stories develop a sense of story structure and flow.'' Moss and Stott (1986) added, ''Grade school students we studied were better able to comprehend, predict, and construct narratives after exposure to stories.'' In a study mentioned earlier, storyteller Donald Davis made the same observation. Listening to stories increased students' ability to structure and understand written and spoken narratives. It improved literacy.

Armbruster et al. (1987) studied ninety students in London and showed that storytelling was statistically at least as effective as reading aloud for language arts development and that both reading to students and telling stories to students effectively increased the major measures of literacy he studied. His assessment included expository as well as story texts.

> ''The relationship of storytelling and children's literacy development is well established.''

As early as 1988, Cliatt and Shaw reviewed available studies and concluded, ''The relationship of storytelling and children's literacy development is well established.'' Further, they stated, ''Children learn and internalize story structure from a diet of told and read stories.'' This internalization forms the core of their language and literacy development. Stories are standard fare of early childhood development. They internalize effective story structure from hearing effective stories even if the adult teller/reader doesn't consciously know what structure they are delivering.

Fisher (1987), Frentz and Farrell (1976), and Ricoeur (1976) all showed that vocabulary takes on its perceived meaning within the context of sentence and story structures. ''Language action is meaningful only in terms of narrative form'' (Ricoeur 1976).

Tannen (1999) compared informal dinner-table conversation, written narrative summaries, and established literature. She concluded that ''they (the linguistic strategies used in successful conversation) were the very same strategies that, in my earlier studies of literature, I had learned to think of as quintessentially literary.'' These strategies were ''on the one hand, sound and rhythm and on the other, meaning through mutual participation in sensemaking.'' Those are story and storytelling attributes. She is saying that we understand and are drawn to narrative when it adheres to story structure. Literacy, itself, then, is linked to story structure based on either the more narrow or the broader interpretation of literacy.

What It Means for Us

I conclude this discussion with the words of developmental psychologist Bruner (1990), who said, ''The form of narratives is, as it were, sedimentary residue of traditional ways of telling, as with Albert Lord's thesis that all narrative is rooted in our ancient heritage of oral storytelling.''

Want to study narrative? Want to develop literacy? Study the structure of story and its original delivery vehicle, oral storytelling, as the origin, root, and foundation of all narrative.

STORY STRUCTURE IMPROVES WRITING SUCCESS

The focus of virtually all research on writing instruction has been on evaluating and developing specific strategies to help students write. Little attention has been paid to studying *what* they write—that is, the effect of story and story structure (versus other narrative and expository forms) on writing process and proficiency.

My extensive classroom experience and testing, however, has direct impact on this question. There is a quantitative test I have been able to run four times on a total of 152 students: two fifth-grade classes in central California, two fourth-grade classes in Maryland, a fifth-grade class in New Mexico, and a fifth-grade class in Nevada.

Each class was taking a standardized writing assessment at the end of a week in which I was to visit the school. Each of these tests required students to write a persuasive essay. I visited one of the schools on the Thursday (day before the test—Nevada) and on Wednesday (two days before the test) in all other cases. I arranged for each class to take a practice writing assessment at the beginning of the week (Monday) and was able to fund sending those tests out for grading not as practice tests (usually scored in-house within the school district), but to the same sets of graders who would grade the actual tests. The graders did not know that these were practice tests.

During my sixty- to ninety-minute in-class visit, I conducted a workshop on story structure (character, character traits, goal, problems, resolution, etc.) and showed how those same story elements could be applied to persuasive essay writing.

Results are awkward to numerically compare because one state used a four-point scoring rubric, two used five-point schemes, and one used a six-point system for scoring proficiency tests. Still, averaged across all students, the Friday test scored almost a full point (0.86) above the Monday score. All that happened in between those two tests was a workshop on story structure. In one case (New Mexico) two other fifth-grade classes at the school took the Monday practice test but did not receive the mid-week workshop. Their scores on Friday were only 0.11 (averaged) better than their Monday scores meaning that the 0.86 increase can be primarily attributed to the effect of story structure workshop on writing proficiency.

Additionally, I have conducted writing workshops with over 220,000 students in forty-two states over the past twelve years. Each of those workshops focuses on the specific informational elements that define effective story structure. I have rarely been able to personally conduct post-workshop student interviews following these sessions. But I have interviewed many teachers (165), school administrators (11), and parents (46) of students who have attended these workshops to assess two things: did the workshop successfully increase student knowledge of story structure, and did it affect the general quality of student writing.

Through the consistency of the qualitative responses I received during these interviews, I have determined that even one-hour story structure workshops have a lasting, noticeable impact on the quality and effectiveness of student narrative writing for most students as well as a large impact on their enthusiasm for and willingness to spend school and home time writing. The noticed change was consistently greatest for students rated below the midpoint of their class in writing proficiency. Students included in this sample stretch from second grade up to high school. "Since your workshop, we have seen profound writing improvements" (from a letter written to me by the school librarian and writing coach of a South Carolina private, college-prep high school).

Note that the improvements qualitatively described by teachers, administrators, and parents include marked improvements in expository writing even though the workshops I conducted focused exclusively on story structure. Learning the specific elements that define story architecture improved students' ability to write both story and expository narratives.

Egan (1997) quoted Spencer, the famed originator of the educational recapitulation theory: "If there be an order in which the human race has mastered its various kinds of knowledge, there will arise in every child an aptitude to acquire these kinds of knowledge in the same order. Education should be a repetition of civilization in miniature" (Spencer 1898). Egan made this reference when he found that his own data supported the notion that students most effectively learned language and math skills in the same order described by Spencer.

Five-year-olds learn to organize thought into language and to write as ancient civilizations did. They learn math processes in the same order that civilization did—count, then add and subtract, then

multiply and divide, etc. Egan's work, then, matches my own conclusion that learning to effectively write stories is a valuable precursor to learning to write other expository forms since stories developed tens-of-thousands of years before expository forms.

My work on student writing also suggests that writing may be considered an effective part of reading and reading comprehension programs. Time and effort spent learning to write stories develop many of the same language skills essential to effective reading. Cooper (1997), Pearson and Dole (1987), Tierney and Shanahan (1991), Shanahan (1990) all come to the same conclusion. From their in-class research, collectively, they list five major reasons to teach reading and writing together.

1. Both are *constructive* processes.
2. They share similar processes and kinds of knowledge.
3. When taught together, they improve achievement.
4. Reading and writing together foster communication.
5. Combining the two leads to outcomes not attributable to either process alone.

My work strongly suggests that the writing portion of that effort is most effective and efficient when focused on story writing supported by articulate mastery of the informational elements that define story structure.

What It Means for Us

Effective writing of any narrative genre (for example, writing to persuade, to inform, expository writing, personal narrative) depends on, and builds from, a learned ability to effectively create and write stories. Story structure is the root for all narrative writing forms and styles. Teach story first at every grade level, adding new complexity and refinement first into the students' ability to create and write stories. Then *extend* these new story skills into other narrative forms.

The recent trend in writing instruction has been to divide writing into separate genre (persuasive writing, comparative writing, informative writing, creative writing, personal narratives, etc.) and to develop specific strategies and writing techniques for each. Zaltman (2003) quotes Vincent Barabba who calls the building of such artificial and unnecessary distinctions ''the triumph of the tyranny of '*or*' over the greater good of '*and*.''' The same concept is succinctly presented in an ancient Moroccan proverb, ''The devil divides; an angel unites.''

All writing is creative. *All* writing is persuasive. *All* writing is informative. Focus on the ''and,'' not on the ''or.'' Base all writing on the common root structure that all writing forms hold in common: story. That is the narrative structure that matches how the human brain needs to receive and process narrative information. The frosting that makes each writing genre appear to be unique only succeeds when overlaid onto a solid, well-made cake. Story structure is the

cake. Help your students master cake baking and then they'll be ready to play with the options of different styles of frosting.

Writing is a creative process. But the activity of writing and the activity of creating what will be written are separate activities. Create first and write second. Creation guides writing. Successful narrative creation depends on a knowledge of story structure. Teach that structure and develop writing plans that spring from that structure to develop consistently successful writing communicators.

STORY STRUCTURE ENHANCES MEMORY

Certainly a major goal of all communication is to place information into the memory of receivers so that they can recall and act on that information. We have already devoted a chapter (Chapter 6) looking in detail at what the modern cognitive sciences say about the internal mental process of memory and recall. Still, it is an important question to address—at least partially—at this point. Does the form and structure of a communication affect a receiver's likelihood to, and ability to, remember key information? Does available research focused on the *use* of stories support the contention that the form of story uniquely enhances memory?

Stories Get Remembered

The importance of memory can hardly be overstated. Murdock (1995) says, "Memory, having a time span of seconds to decades, plays a central role in cognitive processes of attention, perception, problem solving, thinking, and reasoning." If information is not remembered in such a way that it can be readily recalled, there is little point in comprehending it and creating meaning from it.

Rodger Schank reports on decades of studies in the field of Artificial Intelligence and on real and artificial memory. He draws information from studies, lab work, and advanced modeling. He is convinced that story structure enhances memory. "Stories are the way we perceive and preserve the connectivity of events that would otherwise be disassociated over time. A prime reason we want to hear and tell stories is to help ourselves remember them and their content" (Schank 1990). Further, he said, "Stories trigger memories and index labels in the mind of the listener." Schank devotes most of his book to establishing that stories form the framework and structure through which humans sort, understand, relate, and file experience into memory. Story structure is how we view the world; it is how we create meaning of the events around us; it is how we place information into memory; it is how we recall information into consciousness.

In her 1999 work, Deborah Tannen assessed how people respond to and remember three classes of communication: informal conversation, stories (literature), and expository (academic) writing. She concluded that story (the middle category) shares valuable and important characteristics with each of the other two that make it a more effective and powerful communications vehicle. "I now see

music (repetitious sounds and rhythm) and scenic details as triggering emotions and memory.''

Stories Evoke Prior Knowledge

A number of studies (some already mentioned) have shown that story structure facilitates the activation of banks of prior knowledge to enhance comprehension and the process of creating meaning. Several studies have extended that assessment to include memory.

Caine and Caine (1994) describe two kinds of memory functions in the brain. One is used by beginning learners (*taxon*), while the other is used by individuals who have more experience with the topic (*locale*). *Taxon* activity evoked short-term, (at best) spotty memory. *Locale* activated long-term memory of unlimited information and the ability to interconnect information to form meaning and update neural maps. In differentiating between *taxon* and *locale*, Caine and Caine (and later Payne 2002) used, primarily, the existence (or lack thereof) of context for the narrative content. Context, they asserted, was provided by prior knowledge or by familiar story structure.

Making a similar point, Armbruster et al. (1987) stated that ''other research on learning from expository texts has clearly demonstrated that an understanding of the organization and sequencing of ideas and structure in the text strongly affects both comprehension and memory.'' Where content or structural prior knowledge exists, memory is improved. ''One can only conclude for the great number of available studies that reading ability is highly correlated with recall of narrative material and that skilled readers have a greater awareness of, and make greater use of, text structure'' (Armbruster et al. 1987).

Combining her research with previous work by Englert and Hiebert (1984) and Myer (1975), Armbruster (1985) assessed the effectiveness of different text structures to create accessible memories and concluded that story-based problem/solution texts (or, more accurately, character/goal/problem/resolution) were the most successful. Character-based, story structures rated significantly higher than did the expository structures they each studied. Barnett (1984) and Armbruster et al. (1987) found that teaching story structural schema significantly improved the delayed recall of scientific texts for both college students and for ninth-grade students.

Storytelling versus Story*telling*

All studies agree that stories provide a structure that facilitates (improves) memory and long-term recall of key content. Many anecdotal studies (those listed in Chapter 2, for example) strongly suggest that stories lodge information more deeply into long-term memory.

Let's turn for a moment away from the story, itself, and glance at *how* the story is delivered. The major options include: let the receiver read the story, read it to the receiver, tell the story (storytelling), make it a video presentation, or act it out (a play). I have found only two quantitative studies that compared the effect of different ways of

Story structure facilitates the activation of banks of prior knowledge to enhance comprehension and the process of creating meaning.

Character-based, story structures rated significantly higher than did the expository structures.

delivering a story. One is part of an unpublished doctoral thesis. One is a small study I conducted. Both conclude that storytelling (orally telling the story) is the most effective means of placing story information into student memory. I mention this finding because many potential applications of story (for example, education, outreach, motivation, community building) may have flexibility in how the story delivery is designed. When program plans permit, story*telling* maximizes the positive effects of story structure.

Curious about the differing effect of reading a story versus telling a story, in 1998 I arranged to conduct a small experiment with teachers in five Las Vegas schools. Over the course of four days, I performed six assemblies for primary-grade students at these five schools (four were kindergarten through second-grade assemblies and one was kindergarten through third grade). My test, however, involved only first and second graders attending the assemblies.

I presented the same two stories at each of these six assemblies. Both were stories I had written and that were unfamiliar to the participating students. I sought balanced stories of similar length, tone, energy level, and general style. At each assembly, I read one story and told the other. I alternated which story I read and which I told; I alternated the order of stories; and I alternated whether I told or read a story first. I wanted to assess the effect of telling versus reading, but also felt I had to look for an influence from the story (was one consistently more popular than the other?), and from the order of presentation (was, for example, the first always more popular than second?). Since I performed all assemblies, I could minimize any variation due to setting (always using school multipurpose rooms) and performance quality.

I asked first- and second-grade teachers to return their students to class following the assembly and to avoid any discussion of the performance or of either story for twenty-four hours. At that time, and again without any discussion or collaboration, each student was to *quickly* draw one picture from one of the stories as part of a class ''thank you'' packet. The teachers were to collect all pictures and send them to me. Upon receiving the packet I called each teacher to confirm that my instructions had been followed.

I did not try to analyze each picture's content. I only wanted to record which story the picture came from as an indicator of which story lodged more powerfully in the student's memory. The chosen schools included twenty-two first- and twenty-one second-grade classes. Of these forty-three classes, twenty-six followed my directions and sent packets of pictures. These packets included 634 student pictures.

The pictures showed a slight overall preference for one of the two stories (54 percent of all pictures were of that story versus 46 percent for the other). There was virtually no preference for position (52 percent for the first story versus 48 percent for the second).

However, I found a huge preference for the story I *told* (73 percent for the told story versus 27 percent for the read story). This strong preference for the story I told existed no matter which story I told. (Each was told three times and read three times.) Certainly a number of side factors could influence that preference. However, that large a

> The large differential clearly indicates that the process of storytelling lodged the story more deeply, and in greater detail, in most students' memories.

differential clearly indicates that the process of storytelling lodged the story more deeply, and in greater detail, in most students' memories. The resulting conclusion: Storytelling enhances memory.

As a small section of his unpublished doctoral work, Janner (1994) conducted an interesting study with four fourth-grade classrooms. He delivered the same story to each class. To one, he read the story; to the second, he gave copies of the story and had students read it; to the third, he showed a video of the story; and to the fourth, he told the story. One month later he interviewed selected students from each class to see how the medium of delivery affected their long-term memory of the story.

The students who most accurately recalled the story and its images came from the class that had seen the video. However, they typically required extensive prompting to activate those remembered images. The students who were the most enthusiastic and excited about their recollection of the story, who most readily recalled the story without prompting, who held the most vivid and expansive images of the story, and who were best able to verbalize their memory (and version) of the story were those from the class to whom he *told* the story. Clearly, this was a small study that contained many uncontrolled variables. Still, its conclusion is inescapable and dramatic. Storytelling creates excitement, enthusiasm, and more detailed and expansive images in the mind of the listener than does the same story delivered in other ways. Stories and story structure (no matter how the story is delivered) can increase memory and improve content recall. This quality is one more link in the growing chain of evidence to establish the preeminence of story as a teaching and learning vehicle.

What It Means for Us

Available research is clear on the following concepts. Stories provide:

- A greater density of details (and especially sensory details).
- More expansive and detailed mental imagery.
- A better match to the specific information needs of the mind (than other narrative forms) to create comprehension and meaning.
- Activation of a greater number of banks of prior knowledge.

These four factors, in turn, create a higher probability that something will be placed into memory and a greater probability that it will be readily retrieved from memory.

Finally, in two small but significant studies, oral storytelling proved to be more effective than other methods of delivering story material in placing the story and its images into memory in such a way that they were easily, quickly, and readily recalled to the conscious mind.

Use the power of story to drive your key points, concepts, and other information into the memory of your audience and, for those central points, tell the story for greatest communications success.

A FINAL SUMMATION

Research overwhelming, convincingly, and without opposition provides the evidence I sought. Are stories a more efficient and effective vehicle for communicating factual, conceptual, emotional, and tacit information and a more effective teaching vehicle? Not only yes, but absolutely, yes!

In this chapter I have referenced over 120 credible studies (representing an analysis of more than 800 other research studies and reports). There are many additional studies I reviewed in preparing this book that I could have included had it not felt like brutal overkill. This great mass of evidentiary support establishes the value of story to education, to science outreach, to organizations, to therapy, to ministry—to any communication effort.

Let's sum up the value of story and story structure with the words of Morris Chang, Director of Education for the Tainan region of Taiwan. In a 2006 speech, he said, ''Research shows that people are genetically coded to have a close relationship with stories.'' He concluded, ''Living in a highly competitive environment places great pressure on the efficiency and effectiveness of every moment spent at school. I am convinced that stories hold a solution. They teach valuable language skills, teach facts and concepts, and are finally something fun for our students to do'' (Chang 2006).

What more could we ask of a single, natural, and flexible teaching and learning tool?

CHAPTER 10

THE PROOF IS IN THE PUDDING: PUTTING STORIES TO WORK FOR YOU

> *Story structure is a uniquely powerful and effective communications tool that can be put to use by virtually anyone.*

What do you remember best from the first nine chapters of this book? I bet you remember most vividly story examples and story demonstrations and remember just the gist of key information I presented in narrative form. See? We remember stories best. And that's the ultimate story proof. When I used *story* (even story fragments) to make a point, you remembered it. Stories work.

The most important message from, and greatest value of, this book is a true understanding of the nature and structure of stories. Once you are armed with that knowledge, the research on successful applications of story (Chapters 8 and 9) will have both accurate meaning and value.

Through nine chapters we've seen why our human brains and minds are stuck with this specific mode of thinking and processing. We've seen how successful stories are even when used sloppily. We've seen neurologically why stories are so effective.

There is little left to say. You've seen the breadth and depth of the evidence. If any question remains, it is: what do you do with it? Here are a few final thoughts on story application by way of summarizing the information in this book. There are many books available that focus on the application of story for different venues. The real point of this book has been to establish the value of, and the need for, using those reference works.

Story is an incredibly versatile and malleable form. Within the confines and mandates of story architecture lie infinite variety and flexibility. You can shape a story for any audience to fit into any niche, culture, language, or genre. You can present the essential story information in any order and from any perspective. You can overtly state this information or craftily imply it through the

actions of central characters. Stories can be fiction or nonfiction. They can be serious, farcical, or designed for any other mood and purpose. And they can still all be stories!

However, a caveat. Not every narrative needs to be or should be a story. Because of their relationship to the thought processes of the human mind, stories hold a unique effectiveness and power. But that power does not come for free. Stories require that you develop and present character, that you identify and present intent, and that the presentation focuses on a character's struggles to overcome obstacles and reach the stated (or implied) goal. There is *story* information that you must gather and develop in addition to content information.

Presenting information in story form also requires more words than presenting the same content information in summary narrative form. Character information and sensory details must be added. Where fixed word limits exist, this can be a significant problem. There are times and situations when it is neither possible nor appropriate to adhere to story mandates. In those cases, don't try to force your material to look like a story. Some situations call for simple factual statements; some for direct summaries of achievements and results. There are often situations when word or time limits preclude adequate character development.

It is always worth considering the use of story structure. When you can, mighty rewards await. When you can't—for whatever reason—don't. Story is not the only narrative structure, and there are times when it is not the most appropriate choice.

GENERAL ADVICE

Humans are truly *homo narratus*, story animals. We learn from and through stories. All stories teach in that receivers' remember and learn from stories. Whether used for formal or informal teaching and to convey attitudes, humor, facts, concepts, values, or any other kind of information, stories teach. They are uniquely effective and efficient at it because they mimic the internal processing of human minds.

From Cooper (1997): "Schema theory contends that individuals understand what they read only as it relates to what they already know." Every human knows about characters and story structure. You can bridge to new content knowledge by relying on existing "text-specific knowledge" as opposed to "topic-specific knowledge" (terms from Paris et al. 1991). Cobb (1994) agreed: "In the most general sense, the contemporary view of learning is that people construct new knowledge and understanding based on what they already know and believe."

Bransford and Brown (2000) showed that "it is essential to develop a sense of when what has been learned can be used." They also stated that "new information has shifted the focus of effective learning from diligent drill to a focus on students' understanding and application of knowledge" (Bransford and Brown 2000). Application requires context and relevance that are provided by story.

McCombs (1996) and Pintrich and Schunk (1996) both showed that learners of all ages are more motivated when they can see the usefulness (relevance) of what they learn and its impact on their own lives and on others. In story terms this simply means to create context and relevance in order to make new

information useful. Glaser (1992) went further when he said that ''knowledge that is not provided within a contextual framework is often 'inert' because it is not activated, even though it is relevant.''

Stories create four things needed for effective learning of any kind: meaning, context, relevance, and empathy. Story is the structure that allows information (data, concepts, values) to bridge from the abstract external world into the human internal world.

Bruner (2003) offered the following advice on story to storywriters: ''Plots need obstacles and goals; obstacles make people reconsider.'' Writers and story-tellers may not understand the theory or reasons behind such advice. But they naturally gravitate toward what works—what achieves the desired reaction and response from audiences. As Fisher (1987) concluded, ''Readers judge first and foremost by story elements and not on logical arguments and information contained therein.''

ADVICE FOR EDUCATORS

Introduce new units and subjects with stories that frame the subject and create context. The stories you use may either be fiction or nonfiction—as long as:

- They are age appropriate.
- They introduce the unit theme.
- They are memorable enough to carry students through the unit.
- They create context for students to use while absorbing information in a topic unfamiliar to them.

Ensure that the central characters in these stories are sufficiently developed to create relevance for your students. Bransford and Brown (2000) found that ''effective learning requires that the learner bring appropriate experiences and context to the academic content.'' When students lack the technical and topical prior knowledge, rely on their story structural knowledge to activate their learning.

Use stories of real historical figures to cement key concepts in students' minds by creating personal relevance and context. Don't just present date, event, and outcome (or discovery and theorem). Include character goal, motive, and struggles to make the story accomplish your teaching goals.

Fiction stories can teach curriculum content as well as nonfiction ones can. Brown (1991) concluded, ''Young children universally understand and delight in fantasy stories. They are clearly able to integrate nature and culture in story space—and readily accept clothed and talking rabbits without expecting story elements to translate back into their real world.'' Character is the universal space that allows children to translate story learning into real life and vice versa. Through the fantasy ''reality'' of story, children learn and understand complex concepts they cannot grasp through logical, factual, or argumentative presentations.

Teach story structure. Ensure that students master not only the better definition of story, but also each of the informational elements listed in that definition. Haven (2004) is a good example of a book designed specifically for this purpose. Help students see that all other narrative structures are derivatives of this core story architecture.

Teach *story* writing as a way to master not only the elements of this structure, but also of all narrative writing and of reading comprehension. Drill on each

element—the creation of, nature of, look of, purpose of, and effect of each. Give story-writing prompts and have students spend most of their writing time writing stories. Along the way, they will naturally understand and master the common derivative forms (persuasive, informative, etc.).

Refocus writing assignments and prompts away from plot questions toward character-based prompts. This will reinforce their growing awareness of the character base and character dependency of effective narrative writing.

Help students develop the habit of creating core narrative elements orally before writing. Help students and school families break prevalent myths and misconceptions about stories.

ADVICE FOR LEADERS

Embed key corporate and organizational values, attitudes, beliefs, and histories into stories. Use relevant characters (preferably nonfiction) and include their goals, motives, and struggles. Focus where possible on the dilemmas these characters faced that pit competing values and goals against each other. Make them struggle before they reach successful resolution. Focus on stories in which the final climax and resolution depend on the application of the values, attitudes, and concepts you want to instill in those under you.

Provide key story elements as part of any communication with unfamiliar information or when your goal is to motivate, to inspire, or to create a sense of belonging and community. Story structure creates context, relevance, and empathy. Shuman (2006) defines empathy as, ''People gain understanding, through narrative, of experiences they do not share and characters they do not know.''

As an example of empathy in action, Shuman tells the allegorical parable, ''Welcome to Holland'' for those caught in situations that are not their first choice. In this story, you plan a trip to Paris. Upon landing, the flight attendant says, ''Welcome to Holland.'' Of course you are disappointed. You wanted to go to Paris. Holland is not what you planned or wanted. But here you are, stuck in Holland. Still, Holland is a nice place—if you don't waste your time grousing about not being in Paris.

Everyone who hears this story gets its point and is empathetic both to the traveler and to his or her own situation. Shuman (2006) concludes, ''Parable successfully says things that cannot be said or are not said. . . . Parable and allegory can create sentimental identification with goal, struggles, and emotions of the story character.''

Allow organization members to share their own stories. Feature member stories in internal publications and promotions. This will build a sense of belonging, community, pride, and mutual support.

Use these same story principles in external communications. Don't be reticent to include company struggles and dilemmas. Overcoming these obstacles strengthens the company in the eyes of the reader as easy successes never can.

For purposes of internal communications, you may either tell or write these stories. But telling is more personal and creates a stronger connection. Frame major presentation points in story form. Again, emphasize the conflict and struggle aspects of the story to create empathy and support for the resolution. Use story and storytelling trainings as team-building activities. Use story awareness as a management strategy.

However, as Bransford and Brown (2000) remind us, ''It is essential to develop a sense of when what has been learned can be used.'' Make sure that the content and themes of shared stories are directly applicable to the daily life of organization members and that opportunities are established to share stories that team members develop.

Why spend company time creating story structures within the organization? As Bruner's experiments established, ''Give subjects (readers) a reason for embedding their judgment in a story, and they will ignore Bayesian (most logically and likely) probabilities'' (Bruner 1986).

The question is not, ''Will stories emerge in my organization to control member outlook and attitude?'' They will. The pertinent questions are: Who will create and control these stories? And how will these core stories be created?

ADVICE FOR OUTREACH COMMUNICATORS

Your goal as an outreach writer is always the same: Have the reader understand, comprehend, and apply your information to affect their beliefs, attitudes, decision making, and actions. To meet that goal, you must write differently for different audiences.

People who work in the technical field you are describing already possess the banks of prior knowledge to create context, relevance, and empathy. They need only the new information. That is not true, however, for the wider audience you hope to reach with your outreach writing.

It may be technical information that you want to convey. But it is *story* that creates context and makes it relevant. It may be new science developments you want to communicate, but it is character that makes it meaningful. It may be important new concepts you want to communicate, but it is the details of the human experience that make it memorable. It may be new accomplishments you want to describe, but it is the struggles en route to those accomplishments that will make readers relate to, and care about, the accomplishments.

Bruner (1986) put it this way. ''Science strives to define universalities of the world that are context independent. Stories strive to create universalities through context dependent situations.'' The two are neither mutually exclusive nor incompatible. Instead, they act as complements to each other, creating a powerful and effective whole. Use story structure to create context and relevance for unfamiliar topics.

Put a face on it. Science doesn't happen by itself. The people who do the work, their challenges and struggles *are* the story. Tell readers about the people in order to make the science comprehensible and meaningful.

Avoid the family story syndrome. When telling family stories to family members, there is no need to include character description (everyone already knows them), goal, or motive. (These also are general common knowledge.) Family stories are then reduced to plot descriptions laden with family jargon and phraseology that have developed over the years. It's fine for those in the family, but meaningless and boring for those outside the family.

Science fields and scientists have traditionally written for other scientists already in the particular field of science. For brevity's sake, they have left out the same information omitted from family stories and have achieved the same result. Science writing is perfect for those already in that particular field, but a morass for others. The job of the outreach writer is to translate from ''family''

jargon and its implied information into the story-based form needed for non-family members.

FICTION VERSUS NONFICTION: A FINAL COMFORT AND WARNING

Many writers rightfully worry about the truth and accuracy of the stories they write. They naturally assume that if they don't make up anything for their story the story will be nonfiction. This is yet another misconception.

Nonfiction is not equal to truth and reality. The act of picking specific language, of including or excluding specific events and details, and of organizing the material into a flowing narrative sequence automatically fictionalizes the story by adding perspective, viewpoint, attitude, and belief. Facts and reality are all subject to both internal and external review, interpretation, inference, and the process of creating meaning. There is no such thing as ''the truth, the whole truth, and nothing but the truth'' (Freeman 2003).

Bruner (1986) agreed when he stated, ''The medium of exchange in which education is conducted—language—can never be neutral. It imposes a point of view not only about the world to which it refers but also toward the use of mind in respect to that world.'' The act of selecting certain words and images to include and/or to exclude from a story automatically places both a personal bias and set of values into the writing that will color the reader's images and thus, technically, fictionalize the writing. The myth of the dispassionate, neutral observer is just that, a myth, a fiction that never actually existed.

Don't argue to be the neutral, detached scientific observer. Effective outreach writing (or teaching—or communicating in general) comes from inserting those very attributes of story that scientists think they are supposed to write out.

We equate FICTION with false, made up, lies, and ''stories.'' We equate REALITY with nonfiction, true, facts. But all events (facts) are subject to some interpretation that fictionalizes them from raw historical ''reality.'' ''Reality'' is as much a lie as fiction (Freeman 2003).

Fiction is a process of mental construction that produces ''human truth.'' Meaning and understanding (both critically important) come for the fictive process. *The only meaningful difference between fiction and nonfiction is that fiction describes events that haven't happened yet* (Freeman 2003).

Write with conviction. Write with passion and energy. Write with your vision fixed on the human truths about your characters. Then the royal road to successful communication is yours.

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About the Author

The only West Point graduate and only senior oceanographer to become a professional storyteller, KENDALL HAVEN has performed for over 4 million. He has won numerous awards for his storywriting and his storytelling and has conducted storywriting workshops for 45,000 teachers and librarians and 250,000 students.

Haven has authored five audio tapes and 28 books including three award-winning books on story: *Write Right* and *Get It Write* on writing, and *Super Simple Storytelling*, on doing, using, and teaching storytelling. Through this work Haven has become a nationally recognized expert on the architecture of narratives and on teaching creative and expository writing.

Haven served on the National Storytelling Association's Board of Directors and founded the International Whole Language Umbrella's Storytelling Interest Group. He has served as co-director for five western storytelling festivals, including two student storytelling showcase festivals.

He lives with his wife in the rolling vineyards in rural Northern California.