

# 6

## PEOPLE PROCESS INFORMATION BEST IN STORY FORM

In the chapter “How People React Emotionally,” you learn more about how stories are important to engage people emotionally. Stories are also a main way that people understand the content of your presentation. They help people process information, and they imply causation.

### THE STRUCTURE OF A STORY

Aristotle identified the basic structure of stories, and many people have since expounded on his ideas. One model is the basic three-act structure: beginning, middle, and end. This may not sound very unusual, but when Aristotle came up with it over two thousand years ago it was probably pretty radical.

Let’s apply Aristotle’s ideas to the story I use in the chapter “How People React Emotionally.” Here’s the story:

One day many years ago, I found myself in front of a classroom full of people who did not want to be there. Their boss had told them they had to attend the talk I was giving. I knew that many or most of them thought the class was a waste of time, and knowing that was making me nervous. I decided to be brave and forge ahead. Certainly my great content would grab their attention, right? I took a deep breath, smiled, and with a strong voice, I started the session with a big, “Hello, everyone. I’m certainly glad to be here.” More than half the class wasn’t even looking at me. They were reading their e-mail and writing to-do lists. One guy was reading the morning newspaper. It was one of those moments where seconds seem like hours.

I thought to myself in a panic, “What am I going to do?” Then I had an idea. “Let me tell you a story,” I said. At the word *story*, everyone’s head jerked up and all eyes were on me. I knew I only had a few seconds to start a story that would hold their attention.

According to Aristotle’s model, in the beginning you introduce your audience to the setting, the characters, and the situation or conflict. In my story, I introduced you to the setting (I had to give a class), the characters (me and students), and the conflict (the students don’t want to be there).

My story was very short, so the middle part was short too. In the middle part of a story, there are typically obstacles and conflicts that the main character has to overcome.

These are usually somewhat, but not completely, resolved. In my story, the main character tried her usual opening and it failed. Then she started to panic.

At the end of a story, the conflict comes to a climax and is then resolved. In my story, I thought of what to do (tell a story to the class), I did it, and it succeeded.

This is just a basic outline. There are many variations and plots that can be added and woven in.

### STORIES IMPLY CAUSATION

Stories may create causation when none is there. Because stories usually involve some form of chronological narrative (first this happens, next this happens), they imply causation even where none exists. Christopher Chabris and Daniel Simons give this example in their book *The Invisible Gorilla*. Look at these two passages:

Joey’s big brother punched him again and again. The next day, his body was covered by bruises.

Joey’s crazy mother became furiously angry with him. The next day, his body was covered by bruises.

In the first passage, you don’t need to assume much. Joey got punched, and he has bruises. He got the bruises from being punched. In the second passage, the inference is not quite so clear. Research shows that your brain will actually take a little bit longer to ponder the second paragraph. Yet most people will conclude that Joey has bruises because of his mother, even though the passage doesn’t say that. In fact, if you ask people later to remember the passage, they will believe that they read in the story that Joey’s mother actually hit him, even though that is not what the paragraph says.

People are quick to assign causality. Your brain assumes you have been given all the pertinent information and that there is causation. Stories make it even easier to make this causal leap. If you are looking to convince people of a certain idea or persuade them to take a certain action, then using a story that implies causation will help people to be convinced.

Here’s an example: I give presentations about why it is important to use psychology principles to design persuasive Web sites. Here are two different ways I could explain the principle that you have to be careful what colors you use:

Colors are important. They can affect behavior. Choose your colors carefully and be aware of their meaning—for example, in many cultures red means danger or stop. You would not want to use red as the color of a button, because people would hesitate to press the button.

OR

I was recently reviewing a Web site for a client. On the homepage of the site, they had a short form for people to fill out to have the company contact them.

Filling out the form was the main action they really wanted the Web site visitors to take. But the button was red. I told them that for their audience, red means danger or stop. People will be much less likely to press a red button. They looked up their Web site data, and sure enough, they discovered that so far no one had filled out the form and pressed that red button!

The story about the red button implies that the reason no one was pressing the button was because it was red. The story makes the point more strongly than just giving the information does.

## STORIES ARE IMPORTANT IN ALL COMMUNICATIONS

Sometimes clients say to me, "Stories are fine for some presentations, but I'm giving a serious talk." Not true. There are appropriate stories you can use any time you are trying to communicate.

Think about this example: You are a shareholder for a medical technology company. At the annual shareholder meeting that you attend, one of the speakers shows a list of the medical products the company makes and says, "Our medical products have helped hundreds of patients around the world."

Now think about this example: The same presenter shows a picture of a smiling 45-year-old woman walking on a city street and says, "Marianne Winter had such severe lumbar scoliosis that the pain incapacitated her, and the deformity was progressively getting worse. Then she underwent spinal fusion surgery using our spinal products to correct the alignment. Today, Marianne's spine is much straighter, her pain is virtually gone, and she is several inches taller." It's a serious topic, but a story makes the point much stronger.

### Takeaways

- \* Stories are the natural way people process information.
- \* Use a story if you want people to make a causal leap.
- \* Stories aren't just for fun. No matter how dry you think your information is, using stories will make it understandable, interesting, and memorable.

## 7

## PEOPLE LEARN BEST FROM EXAMPLES

In the previous topic, I wrote about Aristotle's model of the structure of a story. What if I had just told you the facts and left it at that?

Aristotle identified the basic structure of stories, and many people have since expounded on his ideas. One model is the basic three-act structure: beginning, middle, and end. This may not sound very unusual, but when Aristotle came up with it over two thousand years ago it was probably pretty radical.

You may or may not have processed that information, and you might not remember it. Instead of just giving you the facts, I also gave you an example. I walked you through how Aristotle's outline applied to my story.

According to Aristotle's model, in the beginning you introduce your audience to the setting, the characters, and the situation or conflict. In my story, I introduced you to the setting (I had to give a class), the characters (me and students), and the conflict (the students don't want to be there).

My story was very short, so the middle part was short too. In the middle part of a story, there are typically obstacles and conflicts that the main character has to overcome. These are usually somewhat, but not completely, resolved. In my story, the main character tried her usual opening and it failed. Then she started to panic.

At the end of a story, the conflict comes to a climax and is then resolved. In my story, I thought of what to do (tell a story to the class), I did it, and it succeeded.

The example provides more information, it helps you process the information more deeply, and it makes the information more likely to be retained in memory and recalled later.

### Takeaways

- \* People learn best by example.
- \* If you provide an example, your audience will process the information more deeply and remember it longer.
- \* Don't just tell people what to do. Show them.

## 8

## SHORT-TERM MEMORY IS LIMITED

Before you read any further in this chapter, read over the following list of terms for about 30 seconds, and then keep reading the chapter:

- |                |              |
|----------------|--------------|
| ★ Meeting      | ★ Staff      |
| ★ Work         | ★ Whiteboard |
| ★ Presentation | ★ Phone      |
| ★ Office       | ★ Chair      |
| ★ Deadline     | ★ Shelf      |
| ★ Computer     | ★ Table      |
| ★ Papers       | ★ Secretary  |
| ★ Pen          |              |

We'll come back to this list later in the chapter. First, let's learn about the frailties and complexities of human memory.

Everyone has experienced a moment like this: You're on the phone, and the person you're talking to gives you the name and number of someone you need to call right away. You don't have a pen or paper to write down the information, so you repeat the name and number over and over to help yourself remember them. You try to get off the phone quickly so you can make the call while the number is still running through your head. You may find that your memory isn't very reliable in this situation.

Psychologists have many theories about how this type of memory works—some refer to it as short-term memory, others as working memory. In this chapter, we'll call this type of quick memory—the memory you need for less than a minute—*working memory*.

### WORKING MEMORY AND FOCUSED ATTENTION

There's only so much people can hold in working memory before they forget it. Information in working memory is easily interfered with. For example, if you're trying to remember a name and phone number and someone starts talking to you at the same time, you're probably going to get very annoyed. You're also going to forget the name and number. If you don't concentrate, you'll lose it from working memory. This is because working memory is tied to your ability to focus attention. To maintain information in working memory, you must keep your attention focused on it.



### Stress impairs working memory

Scans of the brain using functional magnetic resonance imaging (fMRI) show that there is less activity in the prefrontal cortex (the part of your brain right behind your forehead) when you're under stress. This indicates that stress reduces the effectiveness of working memory.

### WORKING MEMORY VS. SENSORY INPUT

Interestingly, there is an inverse relationship between working memory and the amount of sensory input you are processing at any given time. People with high-functioning working memories are better able to screen out what's going on around them. Your prefrontal cortex determines what you should pay attention to. If you can tune out all the sensory stimuli around you and instead focus your attention on the one thing in your working memory, you'll be able to remember it.

### PRESENTATIONS CAN EASILY OVERLOAD WORKING MEMORY

Typically, presentations are given in a short amount of time. Most presentations aren't a semester-long college course. They are a short burst—for example, 2 hours, 1 hour, or even 20 minutes. Presenters often feel compelled to pack as much information as possible into that time period. It's easy therefore to overload working memory by giving people more information than they can possibly process or store in long-term memory.

### Takeaways

- ★ Don't ask people to remember too much information at once. If you do, they'll probably forget the information and get frustrated.
- ★ When you introduce new information, take the next few minutes to build on it with stories, examples, or exercises (or all three) so that it can move from working memory into long-term storage.
- ★ Instead of trying to pack as much information as possible into your presentation, pick a few items that are really important and concentrate on those.

# 9

## PEOPLE REMEMBER ONLY FOUR ITEMS AT ONCE

If you're familiar with usability, psychology, or memory research, you've probably heard the phrase "the magical number seven, plus or minus two." This refers, actually, to what I would call an urban legend: George A. Miller (1956) wrote a research paper showing that people can remember from five to nine (seven plus or minus two) things and that people can process seven plus or minus two pieces of information at a time. Have you heard that story? Well, it's not quite accurate.

### WHY IT'S AN URBAN LEGEND

Psychologist Alan Baddeley questioned the seven plus or minus two rule. Baddeley (1994) dug up Miller's paper and discovered that it wasn't a paper describing actual research; it was a talk that Miller gave at a professional meeting. And it was basically Miller thinking out loud about whether there is some kind of inherent limit to the amount of information that people can process at a time.

Baddeley (1986) had conducted a long series of studies on human memory and information processing. Others followed in his footsteps—Nelson Cowan (2001), for example. The research now shows that the "magical" number is four.

### USING CHUNKS TO TURN FOUR INTO MORE

People can hold three or four things in working memory as long as they aren't distracted and as long as their processing of the information is not interfered with.

One of the interesting strategies people employ to help our fragile memories is "chunking" information together into groups. It's no accident that US phone numbers look like this:

712-569-4532

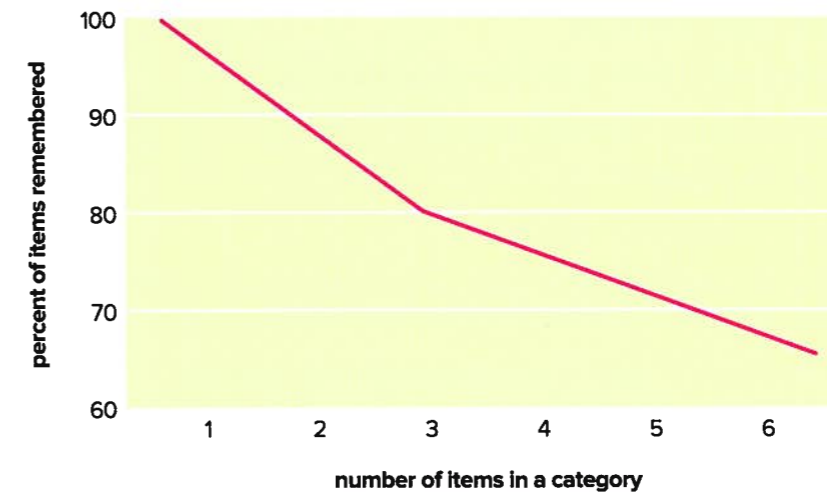
Instead of having to remember ten separate numerals, a phone number has three chunks, with four or fewer items in each chunk. If you know the area code by heart (that is, it's stored in long-term memory), then you don't have to remember that part of the number, so you can ignore one whole chunk.

Years ago, phone numbers were easier to remember because you mainly called people in your area code, so you didn't have to hold the area code in working memory; it was in long-term memory, which we will get to shortly. In the good old days, you didn't even need to use the area code if the number you were calling from was in the same

area code as you were dialing from (not true anymore in most places). And to make it even easier, everyone in town had the same exchange (the 569 part of the previous phone number). If you were dialing someone in your town with the same exchange, all you had to remember was the last four numbers. No problem! (I know I'm dating myself here by telling you how it used to be back in the old days. I live now in a small town in Wisconsin, and people here still give their number to others as the last four digits only, even though now you have to use the area code and then all seven numbers.)

### THE FOUR-ITEM RULE APPLIES TO MEMORY RETRIEVAL TOO

The four-item rule applies not only to working memory, but also to long-term memory. George Mandler (1969) showed that people could memorize information in categories and then retrieve it from memory perfectly if there were one to three items in a category. The number of items recalled dropped steadily when each category contained more than three items. If there were four to six items in a category, then people could remember 80 percent of the items. It went down from there, falling to 20 percent if there were 80 items in the category (**Figure 9.1**).



**FIGURE 9.1** The more items there are in a category, the less accurate memory is.

Donald Broadbent (1975) asked people to recall items in different categories—for example, the Seven Dwarfs, the seven colors of the rainbow, the countries of Europe, or the names of current shows on TV. People remembered two, three, or four items clustered together.

## USE CHUNKING IN YOUR PRESENTATION

Many, or even most, presentations have more than three or four ideas and concepts. Instead of having a long list of 12 or 15 different topics, group items so that you have three or four overall topics. These can then be broken up into three or four items each.

For example, here is a list of topics for a presentation on how to start and run a successful small business:

- a. Deciding what products and services to offer
- b. Deciding how to price your products and services
- c. What online marketing is critical for you
- d. What person-to-person marketing is critical
- e. Do you need to incorporate?
- f. What you need to know about taxes
- g. Should you hire employees or use contractors?
- h. What software to use for invoicing
- i. What software to use for email contacts and email marketing
- j. Effective sales techniques for small businesses
- k. Identifying your target market
- l. Designing and implementing a Web site

Instead of using this as your topic list and talking about and showing the list at the beginning of your talk, you could chunk the topics into the following groupings:

- ★ Selling Your Products and Services (which would include a, b, j, and k)
- ★ How To Kick-Start Your Marketing Plan (c, d, i, and l)
- ★ The Business of Your Business (e, f, g, and h)

Each of these major topics could have three or four topics under them, and each topic can be further broken into three or four points. You can now introduce your presentation without overwhelming your audience, and you can provide all the content in digestible chunks.

## Takeaways

- \* When you are presenting information, chunk it into categories.
- \* Use three or four major chunks.
- \* Include no more than four items in each chunk.

# 10

## PEOPLE HAVE TO USE INFORMATION TO MAKE IT STICK

How do people move things from working memory into long-term memory? There are basically two ways: repeat it a lot, or connect it to something they already know.

### REPETITION PHYSICALLY CHANGES THE BRAIN

There are 10 billion neurons in the brain that store information. Electrical impulses flow through a neuron and are moved by neuron-transmitting chemicals across the synaptic gap between neurons. Neurons in the brain fire every time we repeat a word, phrase, song, or phone number we are trying to memorize. Memories are stored as patterns of connections between neurons. When two neurons are activated, the connections between them are strengthened.

If we repeat the information enough times, the neurons form a firing trace. Once the trace is formed, then just starting the sequence triggers the rest of the items and allows us to retrieve the memory. This is why we need to hear information over and over to make it stick.

Experience causes physical changes in our brain. In a few seconds, new circuits are formed that can forever change the way we think about something or remember information.

### THE POWER OF A SCHEMA

If I ask you to describe what a "head" is, you might talk about the brain, hair, eyes, nose, ears, skin, neck, and other parts. A head is made up of many things, but you've gathered all that information together and called it "head." Similarly, I could talk about the "eye." You would think about all the things that make up an eye: the eyeball, iris, eyelash, eyelid, and so on. The head is a schema. The eye is a schema. People use schemata (plural for schema) to store information in long-term memory and to retrieve it.

If people can connect new information to information that is already stored, then it's easier to make it stick, or stay in long-term memory, and easier to retrieve it. Schemata allow people to build up these associations in long-term memory. Just one schema helps them organize a lot of information (**Figure 10.1**).



**FIGURE 10.1** A head is made up of eyes, ears, nose, mouth, hair, and other parts. Combining those parts into one schema makes them easier to remember.

### EXPERTS STORE INFORMATION AS SCHEMATA

The better people are at something, the more organized and powerful their schema about it will be. For example, players who are new to the game of chess need a lot of little schemata: the first schema might be how to set up the pieces on the board, the second might be how a queen can move, and so on. But expert chess players can pile a lot of information into one schema with ease. They can look at a chessboard in the middle of a game and tell you what some of the starting moves were, the strategies for each player, and what the next move is likely to be. They could certainly recite how to set up the board and how each piece can move. What would take many schemata for novice players, expert players can store in one schema. This makes retrieval of information faster and easier and makes it easier for the expert to put new information about chess into long-term memory. The expert can remember a lot of information as a single chunk (**Figure 10.2**).



**FIGURE 10.2** For experts, everything on the chessboard is in one schema.

### Takeaways

- \* If you want people to remember something, then you have to go over it again and again. Practice really does make perfect.
- \* The more you know about the audience for your presentation ahead of time, the better you can identify and understand the schemata that your particular target audience has, and craft your presentation to match.
- \* If people already have a schema that relates to information that you are providing, make sure you point that out. It will be easier for them to learn and remember the information if they can plug it into an existing schema.

## 11

### IT'S EASIER TO RECOGNIZE INFORMATION THAN RECALL IT

Remember the memory test earlier in this chapter? Without going back and looking at the list, take a pen and paper and write down as many of the words as you can. We'll use this memory test to talk about recognition and recall.

#### RECOGNITION IS EASIER THAN RECALL

In the memory test you just took, you had to memorize a list of words and later write them down. This is called a *recall task*. If instead I had shown you a list of words or even walked you into an office and asked you which items were on the list, I would have been giving you a *recognition task*. Recognition is easier than recall. Recognition makes use of context. And context can help you remember.

#### INCLUSION ERRORS

All the words you memorized were things related to an office. Look at what you wrote down just now, and compare your list with the original list earlier in the chapter. You probably wrote down some words that weren't even in the original list but that go with the "office" schema. For example, you might have written down "desk" or "pencil" or "boss." Consciously or unconsciously, you were aware that the list included things associated with an office. The schema probably helped you remember items on the list, but it might also have caused you to make errors of inclusion.

#### MINIMIZE WHAT PEOPLE HAVE TO REMEMBER

Your presentation shouldn't be a memory test for your audience. Here are some ways to make sure that you aren't requiring people to remember too much information:

- ★ Provide a handout after the session or via email with a summary of pertinent information and any references, books, or research that you refer to in the presentation. Let people know that you will be providing this information so they don't feel stressed about trying to remember it all or take it all down in notes.
- ★ If you have exercises or activities that require your audience to refer to information you presented, don't make them remember either the instructions for doing the activity or any information they need to complete the task. Instead,

provide a handout with the instructions and required information. Or project a slide during the activity that has the important information and instructions.

- ★ People will remember much less than you think. If some of the information is important for them to remember, plan to repeat it several times during your presentation.

### Takeaways

- \* Try not to require people to recall information. It's much easier for them to recognize information than recall it from memory.
- \* Don't rely on your audience's memory. Repeat important information.
- \* Provide a handout or a slide with instructions and information during activities.
- \* Provide a handout after the presentation with a summary of important information, a list of resources and references that you talked about, or both.

## 12

## MEMORY TAKES A LOT OF MENTAL RESOURCES

The latest research on unconscious mental processing shows that people receive 40 billion sensory inputs every second. Doesn't this mean that they can deal with more than four things at a time? Yes, but the difference is that they can only *consciously* deal with four at a time. When they perceive a sensory input (for example, a sound, the feel of the wind on their skin, a rock in their visual field), they perceive that something exists and is still there. They don't have to remember it. They can continue to receive sensory input about it. But to process information consciously, they have to think about it and remember it. They have to be able to represent it and encode it in their brains. And that takes a lot more mental resources.

### MEMORY IS EASILY DISRUPTED

Imagine you're listening to a presentation at a conference. When the presentation is finished, you meet your friend in the lobby of the hotel. "What was the talk about?" she asks. You're most likely to remember what was seen and heard at the end of the talk. This is called the *recency effect*.

If your phone vibrates during a presentation and you stop listening for a minute to text someone, then you are most likely to remember the beginning of the presentation and forget the ending. This is called the *suffix effect*.

### DESIGN YOUR PRESENTATION TO MINIMIZE MEMORY DISRUPTION

There are a few things you can do, as the presenter, to minimize the potential negative effects of memory disruption.

Make sure you have a strong opening. If people remembered only the opening of the presentation, would they have the most important points? In the chapter "How to Craft Your Presentation," you will learn how to craft a powerful opening for your presentation.

Make sure you have a strong ending. In that same chapter, you will learn what goes into a strong ending. Make sure that your ending has impact.

Accept that many things in the middle of your presentation may be lost. If the middle is more than 20 minutes long, break it up with activities and exercises. By doing this you are essentially creating several small presentations within your presentation. That means each of these small presentations also has a beginning, middle, and end. Since people tend to remember beginnings and endings, breaking up a presentation into several small "presentations" means that people will have a lot more beginnings and endings than middles—they will remember more information.

## ★ Interesting facts about memory

- ★ You store concrete words (table, chair) in long-term memory more easily than abstract words (justice, democracy).
- ★ When you're sad, you tend to remember sad things.
- ★ You can't remember much before the age of 3.
- ★ You remember things that you see (visual memory) more easily than words.

## ➔ People sleep and dream so they will remember

Some of the best research happens through serendipity. Neuroscientist Matthew Wilson was studying brain activity in rats as they ran mazes. One day he accidentally left the rats hooked up to the equipment he used to record their brain activity. The rats eventually fell asleep. To his surprise he found that their brain activity was almost the same whether they were sleeping or running mazes.

Ji and Wilson (2007) started a series of experiments to study this further. Their experiments led them to a theory, not just about rats, but about people, too: When people sleep and dream, they are reworking, or consolidating, their experiences from the day. Specifically, they are consolidating new memories and making new associations from the information they processed during the day. Their brains are deciding what to remember and what to forget.

### Takeaways

- \* Because people can store concrete words (table, chair) in long-term memory more easily than abstract words (justice, democracy), use concrete words instead of abstract ones in your speech and on your slides.
- \* Because people can remember things that they see (visual memory) better than words, use images with or instead of words on slides.
- \* Let people rest (and even sleep—break long sessions into multiple sessions with an evening between them) if you want them to remember information.
- \* Try not to interrupt people if they are learning or encoding information.
- \* Because people will remember beginnings and endings more than middles, have a strong opening and a strong closing. Break long sessions up into several mini-sessions so that there are more beginnings and endings.

# 13

## PEOPLE RECONSTRUCT MEMORIES EACH TIME THEY REMEMBER THEM

Think back to a particular event that happened at least 5 years ago. Maybe it was a wedding, a family gathering, a dinner with friends, or a vacation. Remember the people and where you were. Maybe you can remember the weather or what you were wearing.

### MEMORIES CHANGE

When you think about this event, it probably plays in your mind like a short movie clip. Because you experience memories this way, you tend to think that memories are stored in their entirety and never change, like an archived movie. But that's not what happens.

Memories are actually reconstructed every time we think of them. They're not movie clips that are stored in the brain in a certain location, like files on a hard drive. They are nerve pathways that fire anew each time we remember the event. This makes for some interesting effects. For example, the memory can change each time it is retrieved.

Other events that occur after the original event can change the memory of the original event. At the original event, you and your cousin were close friends. But later on you have an argument and a falling-out that lasts for years. Over time when you recall the memory of the first event, it changes without you realizing it. It starts to include your cousin being aloof and cold, even if that is not true. The later experience has changed your memory.

You'll also start to fill in memory gaps with made-up sequences of events, but these will seem as real to you as the original event. You can't remember who else was at the family dinner, but Aunt Jolene is usually present at these events, and so over time your memory of the event will include Aunt Jolene, even if she wasn't there.

### Takeaways

- \* Because memory is unreliable, don't rely on it for critical information. Provide a hand-out with critical information so that people will not make memory errors after the presentation when they try to apply the information.
- \* If you are concerned that people will forget what they experienced during the presentation, have an activity where they write down or record their impressions and important information they are taking away. In this way, you or they can go back and look at what was written or recorded rather than relying on faulty memory.