7

PRESENTATIONS

Part of being a researcher is presenting your work in person. This can be as informal as your answer when someone asks what you work on or as formal as giving the keynote speech at a conference. Listening to a live presentation should be an easy and painless way for academics to learn about each other's work, but not all presentations are easy to understand. Some difficulty is probably unavoidable when researchers try to convey complex information, but much of the difficulty is unnecessary and could be avoided if presentations were designed and delivered better. I've suffered through countless presentations in my own subfield that I could barely follow. In most cases the research itself was fine, but the presentation was bad. This chapter tells you how to create academic presentations that audiences will understand and enjoy.

The elevator pitch

From the time that you enter a PhD program, people ask what you study. "What kind of research do you do?" asks the family member

at the holiday gathering. "What will your PhD dissertation be about?" asks the woman cleaning your teeth at the dentist's office. "Please start by introducing yourself and telling us what you work on," says the faculty member leading the seminar. After a while, the one-sentence summary of your work feels like a natural suffix to your name and departmental affiliation (e.g., "Barbara Sarnecka, Cognitive Sciences, I work on language and number concept development in early childhood.")

A slightly longer and higher-stakes version of that brief summary is the elevator pitch. Imagine that you are at an academic conference and you find yourself riding up in the elevator with Dr. Famous, who is a big deal in your field. You introduce yourself to Dr. Famous, who politely asks you what you work on. Knowing that you only have a couple of minutes before the elevator ride is over, what do you say? The answer is your elevator pitch.

A good elevator pitch has two parts: The **headline** and the **elaboration**. The headline is a concrete, one-sentence summary of your work. When Dr. Famous asks what you do, you give the headline and then stop talking. If Dr. Famous asks a follow-up question or signals that they want to hear more, then give the elaboration, which should take no more than one minute. Again, after you say your piece, be quiet. Let Dr. Famous ask you questions to guide the rest of the conversation. Table 7.1 gives examples of polished elevator pitches contributed by successful scholars in a variety of disciplines.

Although the elevator pitch is brief and informal, it's not easy to produce a good one spontaneously. So make time to practice these with your writing workshop at least once per term, and recognize that there's likely to be a lot of awkwardness and nervous laughter as people try to describe their research in just a sentence or two. But it's well worth the effort because the end result, a smooth elevator pitch, is a real asset.

Name (Discipline: Subfield) *Headline* Elaboration (only if they ask)
Ashley (Psychology: Developmental Social Cognition) *Toddlers like winners, and they don't like bullies.* We showed toddlers a puppet show where two puppets have conflicting goals and one of them wins. Then we ask who they like better, and toddlers choose the winner. But when the winner knocks the other guy out of the way, then they don't like the winner anymore.
Duncan (Philosophy: Epistemology) *I'm interested in explaining how knowledge is possible, contrary to radical skeptical arguments that suggest otherwise.* I claim that the radical skeptical problem is more challenging than many have supposed, but that even in its strongest form it can be resisted. They key to my solution is to realize that it is in fact two logically distinct problems in disguise. The solution involves showing that two apparently competing current anti-skeptical proposals are in fact not only compatible but mutually supporting—at least provided they are each targeted on the right element of the sceptical problem. I call this dual account of both the skeptical problem and its resolution the biscopic response.
Emily (Neuroscience: Cognitive Neuroscience) *We are learning how brain stimulation can promote stroke recovery.* Clinicians are beginning to look to noninvasive brain stimulation as a tool to improve outcomes after stroke. But the effective stimulation protocols and how they promote plasticity are unknown. My goal is to identify how brain connectivity is impacted by stimulation, which may be beneficial in developing interventions for stroke patients.

Table 7.1 (continued on next page)

Heidi (Political Science: International Relations)

I study how and why groups of countries—called international organizations—succeed and fail to resolve conflicts around the world. Examples of these organizations include the United Nations, NATO, and the European Union.

My research involves interviewing and conducting survey experiments on large numbers of political and military elites (such as high-level military officials and ambassadors) so as to understand how bureaucratic problems within international organizations help or hurt their ability to be effective. Few studies have taken such a close look at the people within these organizations and how—as individuals—they affect the organizations' performance.

Greg (Chemistry: Synthetic Organic Chemistry)

We can help cure cancer by doing some very cool chemistry and make a lot of money.

[This example is written from the perspective of a scientist working in industry, not academia.]

Nature has this amazing cure for cancer, but it's really rare and hard to find in the jungle. In the lab we've figured out a way to improve on an old and expensive synthetic technique, so much so that it is now profitable to make. With current demand forecasts we reckon we can provide a real rate of return higher than any other new drug on the market.

Lisa (Linguistics: Natural Language Processing)

I use insights from how people use language to help machines decode subtle information that people communicate via language text, such as intentions, tone, and identity.

A lot of current approaches to natural language processing don't leverage the insights from psychology about why people communicate the way they do in certain contexts or the more sophisticated representations from linguistics that capture the abstract knowledge that humans have about language. Many of my recent projects have incorporated features that both (i) draw from the psychology of language use and (ii) harness

Table 7.1 (continued)

linguistic abstract representation. I've used these features together with state-of-the-art symbolic machine learning algorithms to automatically detect intentions like deception, tone-like politeness, and whether a single author can truly write as if they were multiple characters (who each have their own styles).

Oren (English Literature: Poetics)

I am interested in connections between the way poems try to portray a human mind in action and the way that contemporary philosophers think about and debate the nature and structure of minds and thought; I'm interested in why these two disciplines haven't recently had much to say to each other, and also in what each has to offer the other.

For example, I'm interested in why scholars of poetry have recently been interested in the problem of "melancholia," while philosophers have been more interested in the problem of "akrasia." Both concepts arguably describe a similar problem: the inability to move on from an unproductive state of feeling or action. Both can be found in the long history of art and thought. So why has it come to pass that one is "poetic" and the other "philosophical"?

I argue that these concepts illuminate a fundamental schism between a philosophical tradition that views "weakness of the will" as an aberration in need of rational justification and a poetic tradition that views the mind's plight (and maybe even its particular virtue) to lie in its insurmountable irrationality. So I read Thomas Hardy's elegiac poetry (in *Poems 1912-1913*, for example) to consider the question of what difference it might make to see mourning as a case of akrasia (remaining stuck in mourning despite knowing better) rather than a melancholy (remaining in the grip of loss and lack because there is nothing better to know).

Rahul (Developmental Biology: Gene Expression)

I'm really interested in how IRES function.

There's increasing evidence that up to 10% of eukaryotic mRNAs use IRES. And while we have a reasonable idea of how viral IRES work,

Table 7.1 (continued on next page)

there's really no basis to understand how their cellular counterparts function. There's no consensus sequence that can predict the presence of an IRES, and IRES-transacting factors are not known. We have a powerful system to study this problem that bypasses the artifacts in cell culture approaches and allows us to use genetics as well.
Sarah (Law: Tax Law) *Tax forms actually make law.* The structure of tax forms—not the instructions, but the structure of the forms themselves, the order in which the user adds, subtracts, divides, and so forth--can resolve ambiguous law, usually without anyone noticing. This raises issues for tax law, and also is an example of some potential problems with computational law, even in the absence of a computer.

Table 7.1 (continued)

Being able to describe your research briefly and clearly makes it much easier to have conversations with people—not only famous people, but also your peers—who are interested in similar topics. The person standing next to you in line for coffee at a conference could be a potential collaborator. If you can easily and comfortably explain what you work on, it could start a conversation that leads to collaborations, invitations to present your work, job opportunities, and other benefits. So practice your elevator pitch.

The poster

Let's assume that you know what information goes on an academic poster. (If not, check out Hess, Tosney & Liegel, 2013; Graves, 2019; or Purrington, 2019.) The traditional scientific poster format does not do a good job of communicating information. Most

posters are densely covered with text, and it takes a lot of time and effort from the reader to figure out what the researchers actually found. Many people dislike poster sessions. The presenters feel disappointed that no one wants to read their poster, and the visitors just feel exhausted. No one learns much.

TRY A MORRISON-STYLE POSTER

Happily, there is a much better way to do it. PhD student Mike Morrison (2019) has applied modern principles of graphic design and user experience to create a much better poster format. It takes no more time or effort to create than the old format, and it communicates the key information much more clearly and easily, even to people who just glance at it from across the room. Morrison's invention gets the official Writing Workshop Seal of Approval. (Five out of five penguins!) Figures 7.1 and 7.2 are examples of posters made in the traditional style and Morrison's new style, respectively.

MAKE IT A CONVERSATION, NOT A SPEECH

Once you have designed a beautiful poster, you will have to present it. The key is to let your presentation be guided by the listener's questions. When you give a poster, you are usually speaking to just one or two people at a time. Don't launch into a monologue like a telemarketer; have a conversation like a normal human being. Follow the same principle as in the elevator talk: Prepare a headline of just one or two sentences, and let the rest of the conversation take the form of a question-and-answer session, where the visitor asks questions and you answer them.

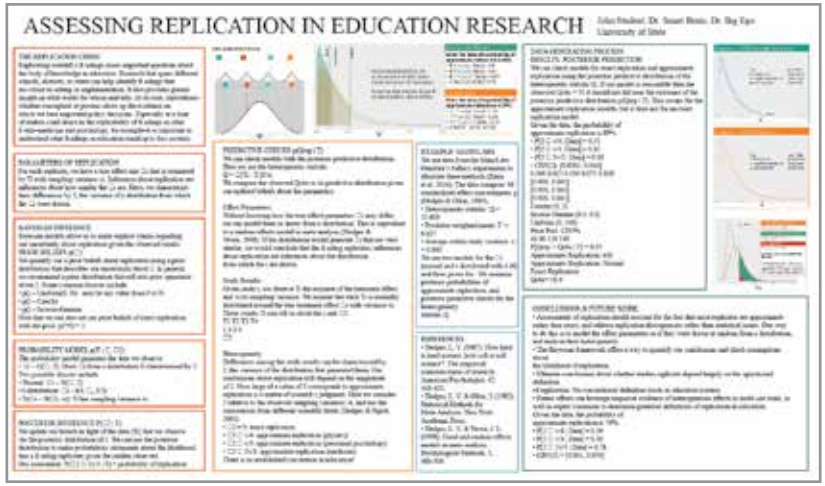


Figure 7.1 Traditional wall-of-text poster

This is the big advantage of posters—you don't have to anticipate the right level of description for your listener, because your listener is standing right there and will (if you let them) tell you what the right level is. Some people want to talk about big ideas; others want to talk about technical details. The poster is there to provide a few key sentences and important visual information. The main source of information is you, having conversations with people.

The talk

The curse of knowledge is a big problem in talks. If you pitch a research article too high (in other words, if you make it too difficult for nonexperts to understand) the only consequence is that fewer people will read it. People who don't have the background to decode it will simply find your article boring and put it down. But those who really need to know what it says can still work their

Figure 7.2 Morrison's billboard-style poster

way through it by looking up terms they don't know, and rereading sentences as many times as necessary, and discussing the paper with knowledgeable others.

Talks are a different story. Audiences at a talk can't control how fast you throw information at them. They can't pause your presentation like a video, and most people are too polite to raise their hand and ask you to repeat or explain things they didn't understand. If a person at your talk loses track of your meaning, they will watch quietly for another couple of minutes and then start checking email on their phone. At the end of the talk, they will applaud politely and ask no questions.

Most academic talks and posters should be pitched at the disciplinary level (see Chapter 3). This is the right level when you are speaking at a conference or in a university department where the audience is mainly other researchers in your field. Presentations to broader audiences (e.g., to faculty from across the university, or to a nonuniversity audience) should be pitched at the public level.

On rare occasions, if you are speaking to a small group of researchers who all work in the same area as you, you may be able to pitch a talk at the subfield level. No talk should be pitched at the lab level. Early-career scientists (particularly graduate students) often make the mistake of attributing too much insider knowledge to their audience. They get used to talking about their work with people in their own labs, and they don't realize that the rest of the world doesn't have the same background knowledge. This is the curse of knowledge in action.

TELL A STORY

A lot of academic and scientific talks are boring. Not just boring to outsiders, but boring to other researchers in the same area. When you can't hold the attention of people who spend all their time thinking about this stuff, you're doing something wrong. Because bad academic talks are boring, one of the most common pieces of advice you hear is that you must grab the audience's attention and hold it. But how are you supposed to do that? The answer is simple: by giving your talk the structure of a story.

Popular story types like romances, murder mysteries, police procedurals, and even jokes all grab and hold people's attention in the same way: They create some kind of tension and then relieve it. The simplest example of this is the joke, which in its classic form consists of a *setup* that creates tension and a *punchline* that relieves it. Here's an example, with the setup in regular type and the punchline in bold:

> The Dean is hospitalized after a heart attack. As she is lying in her hospital bed reflecting on her near brush with death, an attendant arrives with a

> lovely bouquet of flowers. The card reads, **"By a vote of 26 to 3 with 2 abstentions, the faculty wish you a speedy recovery."** (secundem_artem, 2012)

Other genres also rely on tension to keep people reading. Romantic or sexual tension is created when lovers want to be together but are kept apart. The tension is resolved when they get their happily ever after. Adventure stories and thrillers create tension by putting characters in danger. The tension is resolved when the characters are once again safe. Murder mysteries and police procedurals create tension through curiosity and unanswered questions: Who committed the crime? How will they be caught? How high up does the conspiracy go?

All of us who grew up with popular fiction, TV and movies expect these rules to be followed. We know that the joke will have a punchline, the lovers will get together, and the mystery will be solved. Waiting for the tension to be resolved is what keeps us invested in the story. The way to structure a research presentation like a story is by raising some problem or question at the beginning, and then resolving it over the course of the presentation.

Finding the story in translational or applied research

This is easy. You're already working on something people care about; you just have to show them how your particular research connects to the big problem you are trying to solve. Let's imagine that you are trying to cure cancer. You could start your talk as in the fictional example that follows. (Here and throughout the chapter, the rectangles on the left are slides, and the text on the right is what you might say while the slide is visible.)

This opening connects a big problem the audience cares about (curing cancer) to the specific question your research addresses (How can we optimize the process of making Talinexatol?). If they want to learn the answer to the second question, they will keep listening to your talk.

Finding the story in basic research

If you do basic research, you have to work a little harder to make your audience care about the question you are trying to answer, but you can do it. After all, there's some question in there that interested you, right? So you just need to help your audience see it too.

The easiest way to raise a question in your audience's mind is by presenting them with a puzzle—something surprising or counterintuitive that piques their curiosity. It could be some surprising facts about the world, or just an apparent contradiction. Consider this example from the philosopher Duncan Pritchard (2019, personal communication):

> We standardly take ourselves to know a great many things, but there are some apparently compelling philosophical arguments which purport to show that knowledge is impossible. I'm interested in working out how these arguments go awry, and in the process discovering something important about the nature of knowledge (and related notions, like reasons, evidence, and so on).

This is definitely basic research, and Pritchard introduces it by way of an apparent contradiction: *As human beings, we think we know*

Figure 7.3

Does anyone know what this is? Right, it's a jellyfish. It's actually the rare, deep-sea jellyfish scyphozoa talinexae, and right there [pointing to picture] inside its gut is a substance called Talinexatol, which is great at fighting cancers of the mouth and foot in humans. The problem is this guy is so hard to find and lives so deep in the ocean, we just can't get enough Talinexatol for medical use.

Figure 7.4

The good news is it's possible to make Talinexatol in the lab. The bad news is it's a very long process. Time-consuming, labor-intensive, expensive, and not very efficient.

Figure 7.5

Today I'm going to tell you how we're optimizing the current 21-step synthesis of Talinexatol to improve its overall yield from around 5% to 20% or higher, which should make it practical to produce in the quantities needed to treat cancer.

stuff. But some philosophers say we can't know anything. What's up with that? Of course when you start your talk with an unanswered question, puzzle, or contradiction, you implicitly promise that you will resolve it by the end of the talk. If it's a really big question, you probably can't answer it completely. But you should at least be able to show how your work gets us closer to an answer.

Using brief stories to make points within a presentation

Even if you can't figure out a way to structure your whole presentation like a story, you can use stories make smaller points within it. This will still make for a better talk than if you didn't have any stories.

My former student Ashley studies how people think about social hierarchies, which includes how they feel about winners and losers. In order to introduce the idea that adults like winners, Ashley sometimes shows a photo of her father, wearing what appears to be a baseball cap with two brims facing in opposite directions. She puts the picture up on screen and says something like,

> *This is my dad. Can you see what's unusual about the hat he's wearing? Yes, it's actually two hats sewn together. It's a UC-Berkeley hat on one side and a UCLA hat on the other. My brother went to UCLA, and I went to Berkeley. In this picture, my dad is watching the the UCLA-Berkeley football game. And here's the key question: Can you guess which team is winning?*

Ashley points out that the UCLA side of the hat is facing forward in the picture, and she explains that her dad supports whichever team is ahead, turning

his hat around to show his changes of allegiance. She then goes on to present other examples and experimental data showing that adults like winners. But she introduced the idea with a story and an image that were relatable and fun.

As another example, my student Emily studies a classic decision-making problem called the explore/exploit problem. She often introduces this problem by giving audiences a hypothetical explore/exploit task. For example, she might say,

> *Imagine that after this talk, you decide to go out for dinner. Do you go to your favorite restaurant, or try a new one? To go to your favorite restaurant is to exploit a known resource; to try a new place is to explore. Exploring is considered riskier than exploiting, because you might not like the new restaurant. But it also has potentially greater rewards because you might like it even better than your old place.*

To introduce the idea that different people follow different strategies of exploring or exploiting resources, Emily uses the example of her own parents. (I swear I don't tell my grad students to mention their parents in their talks—Emily says she got the idea from Ashley.) She describes how they follow a near-perfect exploitation strategy, eating dinner every Saturday night at the same Legal Sea Foods restaurant in Boston, sitting in the same booth, and ordering the same meals. She shows pictures of her parents, the restaurant, the booth, and the meals. It only takes a few seconds, but it's charming; it makes everyone in the audience smile; and most importantly it clearly illustrates an exploitation strategy that they can understand.

If you happen to study psychology or any aspect of human perception or behavior, you're in luck. Your audience is made up of (relatively) normal humans, so you can often demonstrate the

phenomenon you study by having them do some version of your experiment for themselves.

For example, those who study number estimation often do a demonstration in which they flash an image (e.g., a flock of birds) up on screen for a second or so and ask the audience to yell out how many birds they saw. In this way, they can easily demonstrate that there is almost no variation for small numbers (if I show two birds, everyone yells out "Two!") and lots of variation for large numbers (if you show 20 birds, people yell out numbers ranging from about 15 to 25).

If participants in your experiments listened to a series of musical notes and then judged whether they were mostly ascending or descending, play the notes for your audience and ask them to make the same judgement. If your participants had to decide which of two witnesses was telling the truth, play the two videos for your audience and ask them to decide. Of course not all experiments with human participants can be demonstrated neatly in a talk. But if you can do this, it's a great way to bring the research to life.

Stories must be relevant

If you do use something like a demonstration, an anecdote, or an example, make sure it really does illustrate the phenomenon you want to talk about. The danger with stories and examples, because they are so attention-grabbing, is that audiences get invested in them. So if your opening story or example implies that your talk will be about one thing, but your talk turns out to be about something else, people will feel annoyed and cheated.

Emily (of the Legal Seafood parents), way back when she was a new graduate student, was presenting a study of children's propensity to take risks. "Risk" was operationalized as a choice between two spinners, which were like simplified roulette wheels. One wheel gave the child a single sticker with every spin. The other wheel gave the child two stickers on 50% of spins and no stickers on the other 50%. Choosing the second wheel is considered a "risky" strategy. (This is a child-friendly version of a task long used to studying decision-making in adults.)

Looking for a fun way to introduce the idea of kids taking risks, Emily started a talk about this work with a picture of kids climbing a tree. She said something like, "Kids make decisions about risk and reward all the time. For example, these kids have decided that the fun of climbing this tree is worth the risk of falling." Then she went on to present the study with the roulette wheels.

Afterward, some people in the audience complained, saying that if you wanted to study why kids climb tall trees, the roulette task wasn't a good way to do it. Of course Emily never intended to study why children climb trees. She had merely picked the tree example as a way of introducing the topics of kids and risk. The problem was that the tree-climbing example had been so engaging that some people in the audience really wanted to know how children decide which trees are too high to climb, and they were disappointed and irritated when Emily's work turned out to be about a different kind of risk.

My point is this: Examples, demonstrations, and stories are like flashing lights and sirens. They really grab people's attention, so use them carefully.

If you can't find a story, at least create a list with depth

Research presentations that don't tell stories usually just present a bunch of information in some kind of logical order, which is essentially a list. The presentations may be very well organized, but they aren't stories unless they raise a question at the beginning and answer it by the end. Because lists don't create tension and then

relieve it like a story does, they don't hold an audience's attention as well.

But let's assume that, for some reason, you really can't think of any way to make your talk into a story. In that case, at least create a list with general or abstract points backed up by specific details and concrete examples, so that the list has some depth. For example, imagine that for some reason I have decided to tell you my grocery shopping list. I have several options.

1. I could just read you the list: almond flour, butter, eggs, cheddar cheese, salt, pepper, heavy cream, baking powder.
2. I could give the list some depth and coherence by adding another layer (sections of the store) and ordering the list from the section with the most items to the one with the fewest. Then the list would be something like DAIRY: butter, cheddar cheese, eggs, heavy cream. BAKING AISLE: almond flour. SPICES: black peppercorns. For that kind of list I might start my talk with an outline, saying something like, "I have to get things from three sections of the store: Dairy, Baking, and Spices."
3. I could make it a story. I could start with an image of scones and say something like, "A couple of weeks ago, my friend texted me a picture of these gorgeous black pepper and cheddar cheese scones. I found this really annoying." [First question raised in audience's mind: Why was I annoyed?] "You see, my friend knows that I recently gave up eating flour and sugar. So it seemed like she was taunting me and my pitiable sconeless existence. But of course, she's too good a friend for that. It turns out there's no flour or sugar in these scones at all." [First question answered. Second question raised: How do you make scones without flour?] "It turns out

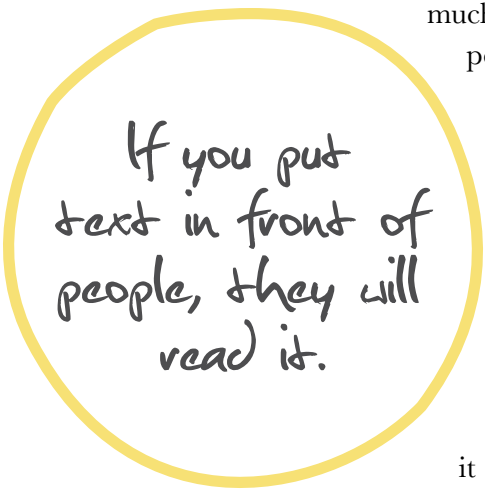
> they're made with almond flour. I decided to make them immediately. The scones required almond flour, butter, an egg, shredded cheddar cheese, salt, pepper, baking powder, and heavy cream. I already had the salt, pepper, baking powder, and egg, so I went to the store to get the rest of the ingredients."

Looking over these three options, you can see how No. 2, the list with structure and depth, is better than No. 1, the flat list. But No. 3, which has a story, is more interesting than either of the first two. In fact, I'm pretty sure that reading No. 1 and No. 2 didn't make anybody want to go to the store and buy that stuff. But No. 3 probably inspired at least some readers to make the scones. (You can find the recipe at Gourmet Girl, 2013. You're welcome.)

GIVE THE AUDIENCE ONE THING TO FOCUS ON AT A TIME

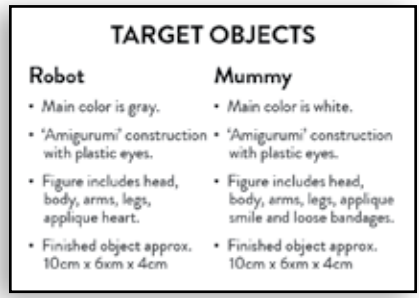
This and telling a story are the two most important principles of a good talk. It's amazing how often speakers violate this simple rule. They hand out printed material for the audience to read during their talk, guaranteeing that no one will listen to them. Or they show text on the screen and then say something else while the audience is reading the text. They put up tables full of data when they only want the audience to look at two cells; they fill their slides with weird backgrounds and animations and expect the audience not to be distracted. The key to giving a good talk is to direct the audience's attention to *one thing at a time*.

Only show text that you want people to read



Many academic speakers not only put too much text on their slides, they compound the error by showing text and then talking over it—that is, continuing to speak while the audience is reading the text. If you put text in front of people, they will read it. They can't help it. The words on the page will grab their attention more than the words you are speaking. So if you put text on a slide, either read it aloud or shut up and let the audience read it themselves. But for heaven's sake, don't show a bunch of text and then expect people to ignore it while you continue speaking.

Let's imagine another silly, fictional example: you are doing a research project where you build a robot that can crochet stuffed toys. In particular, you have designed this robot to be self-aware and to recognize representational art, and you hypothesize that it will crochet faster and make fewer errors when it makes a toy robot



TARGET OBJECTS

Robot	Mummy
• Main color is gray.	• Main color is white.
• 'Amigurumi' construction with plastic eyes.	• 'Amigurumi' construction with plastic eyes.
• Figure includes head, body, arms, legs, applique heart.	• Figure includes head, body, arms, legs, applique smile and loose bandages.
• Finished object approx. 10cm x 6xm x 4cm	• Finished object approx. 10cm x 6xm x 4cm

Figure 7.6

As you can see here, the robot and mummy are very similar. They're both made of just one color with basically the same construction: Both have a head, a body, two arms, two legs ,and two plastic eyes. And they both have a little detail in a constrasting color: The robot has a pink heart and the mummy has a black smile, as well as some loose bandages.

Figure 7.7

As you can see here, the robot and mummy are very similar. They're both made of just one color with basically the same construction: Both have a head, a body, two arms, two legs, and two plastic eyes. And they both have a little detail in a constrasting color: The robot has a pink heart and the mummy has a black smile, as well as some loose bandages.

(with whom it feels a kinship) than when it makes an otherwise similar toy mummy. How do you describe the toy robot and mummy to your audience? You could do it with text, as in Figure 7.6, but in this case you are asking your audience to listen to your stream of spoken language while they simultaneously read (because they can't help it) the conflicting text on the screen. A much better idea is to use images, as in Figure 7.7. Then you can talk and the audience can listen, because they won't be reading at the same time.

Here are the first few slides from a talk I gave about registered reports. Notice how the slides mostly have images, with text used only to highlight key words and phrases. Notice also how the text is revealed a little bit at a time, and I read the words as soon as I show them. (The only exception is the text in the citations.) I also use a plain white slide (in PowerPoint and Keynote you can just press the "W" key) to turn the screen blank when I want the audience to look at me and just listen to what I'm saying. (You can also use the "B" key in PowerPoint and Keynote to turn the screen black, but sometimes that makes people think that the talk is over or the projector is malfunctioning, so I prefer white.) All of these techniques serve the same function, which is to keep the audience's attention where I want it.

Figure 7.8

Raise your hand if you've ever put a lot of work into a project, like you've worked on it for months, and then you didn't end up getting a publication out of it.

[Pause for show of hands.]

Yes, all of us, right? Happens all the time. How much time do we all waste doing studies that get . . .

Figure 7.9

REJECTED for things like lack of novelty, lack of impact, or because the reviewers didn't like the methods? It's incredibly frustrating, right? And not just for authors. Sometimes as a reviewer you say, "This is not a well-formed question. It misrepresents the topic." Or you say, "It's a good question, but these methods can't answer it."

And as an author, sometimes I get rejections that say, "This should have been a between-subjects design" or "You didn't do the right control here," and you know what? Maybe they're right.

And I think, "Thanks a lot, reviewer, where were you when I was designing this study? I could have used this feedback two years ago."

Figure 7.10

And then there are the studies that didn't get rejected because you never submitted them.

You had a good idea, you did the study, but the effect you expected to find just wasn't there. So you didn't have a finding. Which meant you didn't have a paper.

And let's be honest: You didn't just do one analysis and find a null result, and drop it in a file drawer. After working on it for six months? No way.

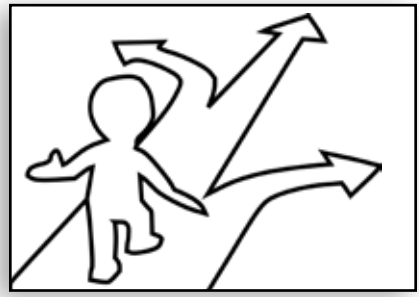


Figure 7.11

You probably tried a whole bunch of different analyses. "What if we exclude outliers that are 3 standard deviations from the mean? How about 2.5? 2?"

"What if we control for age, sex, right-handedness, bilingualism, and task order? No? How about just the first three? What if we split up the groups? Merge the groups? Analyze the high and low performers separately? Use just the first block of trials from each subject?"

The fact is, when you have a big dataset, there are a million different ways you can analyze it. And if you try enough different analyses, you've got a pretty good chance of finding something, even if there's nothing there. Statistician Andy Gelman calls this the "Garden of Forking Paths" problem. It's also called "researcher degrees of freedom."

Figure 7.12

And when you looked for X, didn't find it, looked some more and found Y instead, did you write a paper saying that? No.

Or if you did, reviewers rejected it. They told you you had to come up with an explanation for Y, and write the paper explaining why Y was predictable all along.

In other words, to publish the study, you had to do what's called . . .

Figure 7.13

HARKing, which stands for . . .

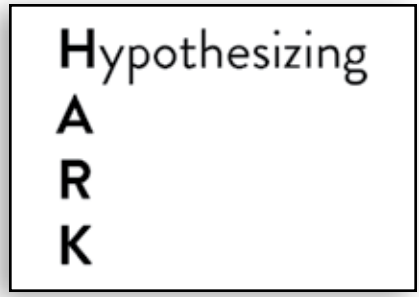
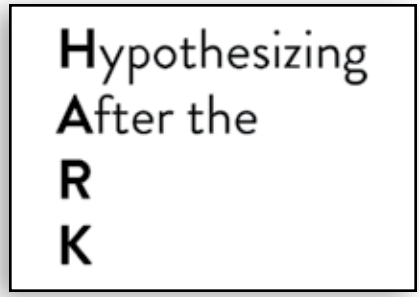


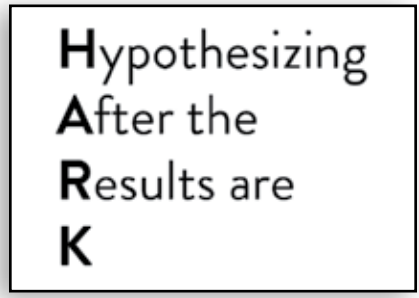
Figure 7.14

Hypothesizing



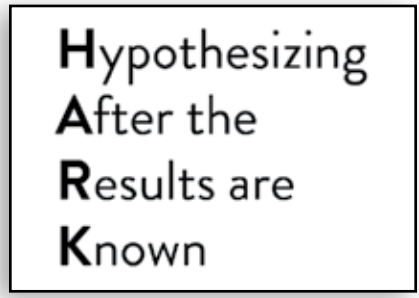
After the

Figure 7.15



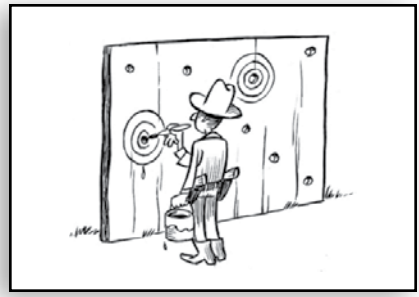
Results are

Figure 7.16



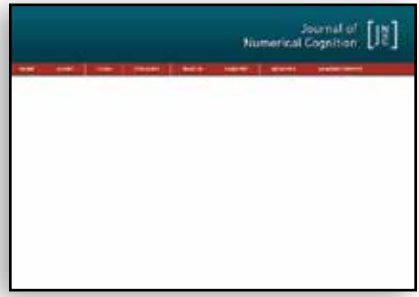
Known

Figure 7.17



It's like the story of the Texas sharpshooter, who shoots a bunch of holes in a wall and then draws targets around them to make it look like he's a great shot.

Figure 7.18



If you agree that there must be a better way to do things, then I have good news for you. The Journal of Numerical Cognition *is now offering . . .*

Figure 7.19

registered reports!

Figure 7.20

After the meeting was over, I created a separate, stand-alone version of the talk to post online. For the stand-alone slides, I added the text that I had spoken aloud at the meeting. Here's the first slide:

Figure 7.21

Maybe it's because academics are used to writing papers, or maybe we're afraid that once we get up in front of the audience, we'll forget what we were going to say. But many speakers prepare stand-alone slides for live talks, putting everything they plan to say on the slides themselves. At best, this makes for a boring talk as you read the slides along with the audience. At worst, it makes for a confusing and irritating talk as you talk over the slides while the audience tries to read them. If you are really afraid of forgetting what you wanted to say, put your talk on note cards that you can read from. But don't put it on your slides.

Reveal quotations one clause (or one readable chunk) at a time

One time when it does make sense to put text on slides is when you quote someone. If it's a long quotation, animate it to appear one clause at a time and read each clause as soon as it appears.

Figure 7.22

This brings us to a quote by the great American poet Maya Angelou, who said,

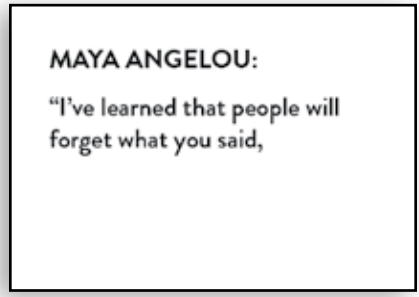
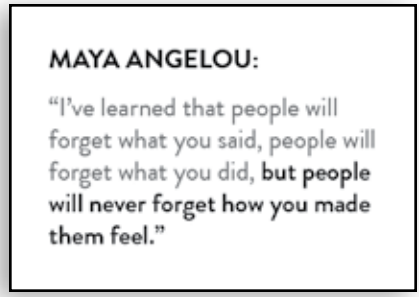


Figure 7.23

"I've learned that people will forget what you said,

Figure 7.24

"people will forget what you did,



"but people will never forget how you made them feel."

Figure 7.25

Reveal data in tables as you mention them

Just as quotations should be shown one chunk at a time in order to manage the audience's attention, so should the data in tables. Tables may be revealed by the cell, row, or column, depending on how much time you want the audience to spend looking at them.

In the example below, a comparison of dog breeds, the first column of the table is revealed one cell at a time as the breeds are introduced. Then the data are revealed one column (one variable) at a time.

Don't show rows and rows of data if you only want to talk about a values or comparisons. Instead, present the relevant information as a figure or just quote the data points you need.

The study compared dogs from three breeds. We had beagles,

Figure 7.26

BREED			
 Beagle (n = 50)			
 Boxer (n = 44)			

Figure 7.27

boxers,

BREED			
 Beagle (n = 50)			
 Boxer (n = 44)			
 Dalmatian (n = 47)			

Figure 7.28

and dalmatians.

BREED	Smart		
 Beagle (n = 50)	4		
 Boxer (n = 44)	4		
 Dalmatian (n = 47)	4		

Figure 7.29

They were all smart. On a scale of one to five, with five being the highest, all of these breeds are about a four.

BREED	Smart	Good with kids	
 Beagle (n = 50)	4	5	
 Boxer (n = 44)	4	4	
 Dalmatian (n = 47)	4	4	

And all of these breeds are pretty good with kids.

Figure 7.30

BREED	Smart	Good with kids	Health
 Beagle (n = 50)	4	5	1
 Boxer (n = 44)	4	4	2
 Dalmatian (n = 47)	4	4	4

Where they differed was in their health. Beagles are great dogs, but they do have a lot of health problems. Boxers are a little better, and dalmatians are pretty healthy.

Figure 7.31

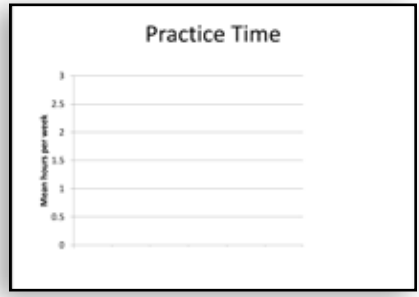
Exceptions to the read-aloud rule

As a general rule, you should read all the text you show as soon as it appears on screen. The exception is text that must be included by law or custom, but that you don't want the audience to focus on. For example, if you refer to your own or someone else's published research, you should put citations on your slides. If you use an image, you should credit the source of the image. If you use a figure with error bars, you should include a label saying what the error bars represent (standard deviations, standard error, confidence

intervals, etc.) To omit these bits of text would be unprofessional, but you don't have to read them aloud. You can put the words in a small font and unobtrusive color (e.g., gray instead of black) and assume that the audience will glance at them only briefly.

Figures and video in talks

As discussed in Chapter 5, figures pack a ton of information into a small space. That's good for a paper but bad for a talk. For simple figures, you can slow the flow of information to a manageable rate by presenting the figure one element at a time.



Our main outcome measure was practice time: the number of hours each student spent practicing the violin each week.

Figure 7.32

We asked them to record their practice time for one week as a baseline measure, and then we followed each family for five weeks.

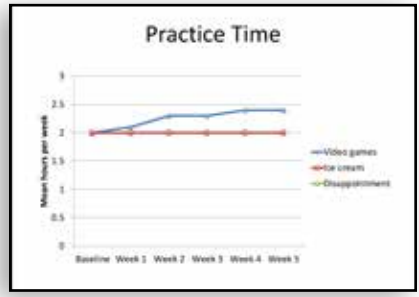
Figure 7.33

Student 1 earned 10 minutes of video games for every 10 minutes of violin practice; Student 2 earned a spoonful of ice cream for every 10 minutes of practice; and Student 3 was told that her parents would be very disappointed in her if she didn't practice for at least two hours.

Figure 7.34

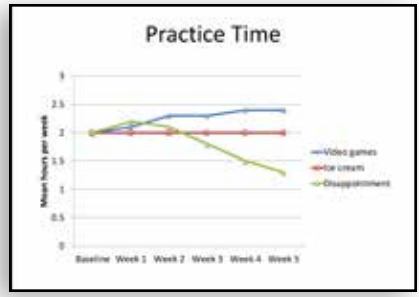
Student 1 kept up her practice over the five-week period of the study, and even increased it from 2 hours to almost 2.5 hours by the end.

Figure 7.35



Student 2 stayed right around two hours of practice time per week.

Figure 7.36



Student 3 practiced slightly more than the other two for the first week, but her practice time steadily decreased over the period of the study, and by the end she was practicing only about 1 hour and 20 minutes per week.

Figure 7.37

A note about accessibility: One of the most common reasons that speakers fail to connect with audiences is that the audience has trouble hearing or understanding the speaker. This can happen because the microphone setup in the room is poor or there is ambient noise, or because audience members have hearing issues, or because the language of the talk is not their first language. To make your talk as accessible as possible, always caption your videos. (Websites like Kapwing let you automatically add captions to video for free.) If you are giving your talk in a room with a reliable internet connection, you can go one step further and auto-caption the talk itself. Just create your presentation in Google Slides and click the captions button when you start presenting. These are small efforts that make a huge difference in the audience's experience.

Practice your presentation

Even if you don't think of yourself as a performer, you are one when you give a presentation. So prepare your presentations early and rehearse them. The more important a presentation is, the more rehearsal it deserves.

My colleague Lisa Pearl, a cognitive scientist and linguist, offers these timelines as examples.

> *I gave an hour-long invited talk on Nov. 15. I started putting it together on Oct. 1, based partially on material I had presented before. I finished a complete draft by Nov. 1 and practiced the hell out of it (i.e., some part of it out loud every day) until I was happy. As another example, for my 30-minute advancement presentation as a grad student, I started putting it together two months in advance and practiced the entire talk out loud every day for three weeks prior.*

Realistically, few speakers are as prepared as Lisa. (This is a woman who prepares all of her lectures for each academic year during the preceding summer.) But even if you are not as well organized as she is, you can improve your own presentations by starting a little bit sooner and rehearsing a little bit more. Even practicing your talk once is better than throwing it together on the plane on the way to the conference. So practice your presentation with anyone who will listen.

CHECK THE TIMING

Time your practice presentation to make sure you will not exceed your allotted time. Going over time is rude to the audience, to the next speaker, and to the organizers. It makes you look unprepared and unprofessional. Feldman and Silvia (2010) suggest using no more than 80% of your time for the talk itself, leaving 20% to answer questions. We've all been to presentations where the speaker

gets the five-minute warning when they still have 20 slides left. So they break into a sweat and start babbling like an auctioneer, racing to cram everything they wanted to say in the minute or two they have left. This mess is completely avoidable if you practice your timing beforehand.

CHECK THE TECH

Make sure the images show up, the animations work, the videos play, and the audio is audible. If you will travel to give the talk, build in backup systems. When you travel, keep a backup of your slides. For example, you could keep one copy on your laptop and another copy online or on a USB drive, in case you need to transfer them to another computer. If you will be running the talk from your own laptop, make sure to bring all the adapters you will need; don't count on the conference organizers to provide them. If you do have to transfer your slides to another computer, click through them beforehand to make sure that the images show up properly and that the audio and video files have sound.

PRACTICE ANSWERING QUESTIONS

Most academic talks have a question-and-answer session at the end. Practice answering questions when you practice your talk. Many inexperienced speakers fear the question-and-answer session. They're afraid that the audience will stump them with hard questions that expose weaknesses in their work, but that rarely happens. By the time you give a talk about your work, you've been thinking about it for a year or two at least. The audience has only been

thinking about it for a few minutes during your talk, so you know a lot more about it than they do.

Most questions fall into one of three categories: (1) The person asks you to clarify some aspect of your work; (2) they ask how your work relates to something else, which usually turns out to be their work; (3) they ask something bizarre that doesn't make any sense. No matter what kind of question it is, follow the same guidelines for responding.

First, smile and nod. Try not to look defensive or angry, even if that's how you feel. Act like every question is reasonable and every questioner is well-intentioned.

Next, repeat the question. This serves several functions. First, it's likely that not everyone heard the question, so by repeating it into the microphone (or loud enough for everyone to hear), you are including everyone in the conversation. Second, repeating the question allows you to make sure that you heard and understood it correctly. Third, if the question didn't make sense, this gives you a natural opportunity to reframe it as one you can answer. For example, let's say you've just finished giving a talk about your work training dogs of different breeds to find people who are trapped under rubble after earthquakes. Someone raises a hand and asks, "How is this related to deregulation of the concrete industry in California?"

Your first thought may be that it's not related, but try to find any hint of a reasonable question in it. For example, you could say, "You raise a good point—if deregulation leads to lower standards for concrete quality, that could make the damage from earthquakes much worse. In that case, search-and-rescue work will be more important than ever."

Sometimes people will ask you to speculate about something that's really outside the scope of the work. In this case, you have two options: Speculate, but be clear that you are speculating, or

refuse to speculate, but talk about what information could be used to answer the question.

When I talk about my research on people's fears of letting children play unsupervised, people often ask what I think the effect of constant surveillance will be on the long-term development of this generation of children. I might say, "Well to be clear, we didn't measure effects on children. We just measured adults' reasoning. But if I were to speculate about the long-term effects on children's development, I guess I would say . . ." Or if I don't want to speculate, I might say something like, "Well no one knows, because no previous generation of children has been raised like this. What we really need, to answer that question, are large-scale longitudinal studies that follow these kids for decades."

Finally, if you get a truly bizarre question and you have absolutely no idea how to respond, you can just look thoughtful and say, "Hmm, I guess I need to think about that some more. Let's talk later." But that's like a get-out-of-jail-free card. You can only use it once per talk.