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0521866812 - Speaking about Science: A Manual for Creating Clear Presentations

Scott Morgan and Barrett Whitener

Excerpt

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# 1 THE BASIC PROBLEM WITH ORAL PRESENTATIONS, AND ITS SOLUTION

Both science and art have to do with ordered complexity.

– Lancelot Law Whyte, in the *Griffin* (1957)

**W**e often ask our students, “What’s wrong with scientific talks?” They invariably respond with variations of: They are boring; they are too complicated; they are hard to follow; the speakers have too much information for the time allowed; they do not recognize the different knowledge levels of the audience; they do not look at the audience; they talk too fast or too softly; they sound bored with their work.

Conversely, we are told that good presentations are clear, concise, and focus on a few key points and that good speakers are enthusiastic and help the audience to become engaged. We have seen many accomplished presenters ourselves, and it is truly inspiring to see science communicated well.

Still, as anyone who has taken the podium has discovered, simply telling oneself, “Be clear” or “Be enthusiastic” rarely assures success. It is easy to despair over not being a “born presenter.” Many struggle because they think they are too introverted, are not funny

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or because English is an alternative language for them. The truth is that there are very few natural presenters, and even they can benefit from technique. One's gregariousness could not matter less in this context; humor is irrelevant to scientific speaking; and nonnative English speakers actually have a few advantages over native English speakers. This is all to say that giving an effective presentation is more a matter of method than of talent.

## Writing vs. Speaking

Both authors have learned about public speaking the hard way. Barrett Whitener, for example, used to take the common approach of writing his speeches out verbatim and delivering them from a script. He took the full text to the podium to ensure that nothing important would be left out. In theory, this tactic was reassuring, but in practice, the detailed wording precluded him from making any meaningful contact with the audience.

Regrettably, for many presenters, a talk is essentially a spoken version of the text. Most of us were taught to construct a written essay by using the three-step guideline, "Tell them what you're going to tell them; tell them; and then tell them what you told them." When it comes time to organize a presentation, many speakers automatically adopt the same structure. Yet, it transfers poorly from the page to the podium.

In principle, whenever written words are involved, the *reader* is in full control of the rate, flow and retention of information. If he daydreams while going over a particular passage, he can read it again. If he needs longer to analyze a chart or graph, so be it. There is unlimited time to absorb the information and its import. Moreover, the reader can learn independently. He can start with the abstract

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before moving on to the data, or vice versa; he might be struck by a photograph and move backward or forward within the article.

The suspension of linear time does not exist in a speaking situation. The *speaker* determines the rate and flow of delivery, and therefore the rate of absorption. But rather than a hindrance, simultaneous learning is public speaking's most useful quality. Live interaction requires the synchronized attention of speaker and audience on the same detail at every moment during a talk. The presenter cannot progress to the next point until he has discussed the current one thoroughly. In addition, the audience gets only one chance to take in the information. That means the speaker must dole out the data in digestible amounts; there is no going back for clarification. But in this subtle exchange, there is a unique opportunity for him and the audience to learn together. The speaker's primary responsibility is to engage the audience's full attention at all times.

A good presentation is essentially the same as a good story. The speaker keeps the audience in sync with him; they are neither ahead of nor too far behind each turn in the narrative. Scientists are aided greatly in this capacity because a clear description of their scientific method is intrinsically engaging. However, the order in which a speaker unveils each piece of information is critical.

A speaker who follows "written structure," for example, often begins a talk with a summary of everything to be covered in it. He might do this via an outline, a handout, or simply a sentence such as, "Today, I will show you how the syntaxin-1 clamp, syntaphilin, controls the SNARE assembly." But in an effort to introduce the topic, he has turned the presentation into a diluted review of data. This arrangement simply divulges too much information too early, without providing the audience with any background or context first. Furthermore, having divulged the end of his story up front, the speaker becomes a passive tour guide and the audience a passive

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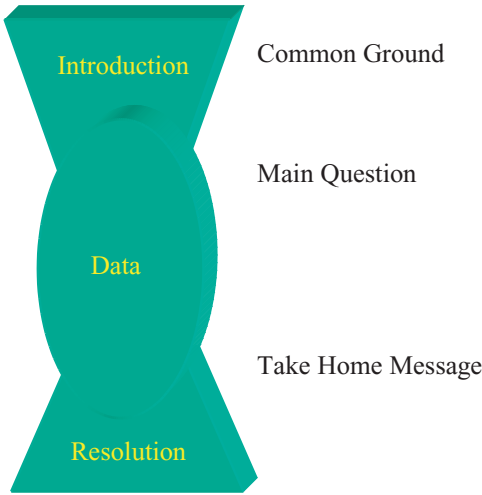
listener. But most importantly, this plan is not good storytelling because it does not reflect the actual research process. Although the scientist may have worked from a hypothesis, he did not know the final outcome when his experimentation began.

Our own misadventures in public speaking, combined with attending thousands of scientific talks, have led us to devise a different model for presentation.

Presentation Structure: The Hour Glass Format

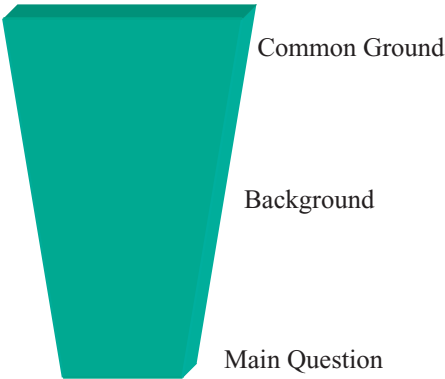
We call it the “The Hour Glass Format” for its shape; this one has two funnels and three chambers (Figure 1.1). The hour glass is a fitting image for the specificity required at certain points (narrow funnels versus wider ones). It provides a visual reference as to which parts should be expressed more broadly, and which parts will need to be explained in relative detail. It also gives a visual impression of the comparative time allocation for each portion, with briefer

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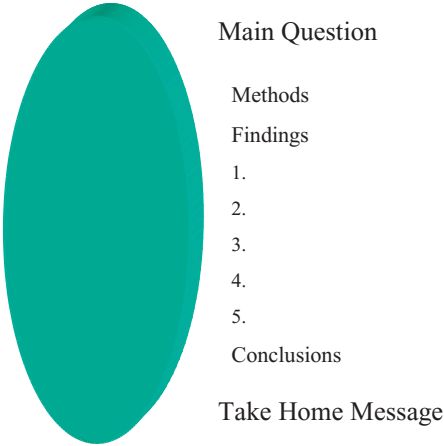
opening and closing segments surrounding the lengthier data section.

To begin breaking down the configuration piece by piece, notice that the widest span of the Introduction (Figure 1.2) is at the top. This represents the initial overture to the audience and should acknowledge their work as well the speaker’s – the shared Common Ground. The amount of information covered in the Introduction depends entirely on the composition of the audience. For most talks, the Introduction comprises about 10 percent of the presentation time. The spotlight here should be on concepts, ideas, definitions and goals. The Introduction is essentially a brief background of “the story so far.” It ends with the primary focus of the talk: the Main Question.

After the Main Question comes the Data Section, the second portion of the model (Figure 1.3). This section highlights the current work or “the story today.” Methodology is presented here, as are any images that help the audience grasp the findings and the course of action. The number of data points that can be comfortably addressed depends on the amount of time allowed for the talk. As an illustration, there are five data points in Figure 1.3. The hour glass shape lengthens in the Data Section to exemplify the larger

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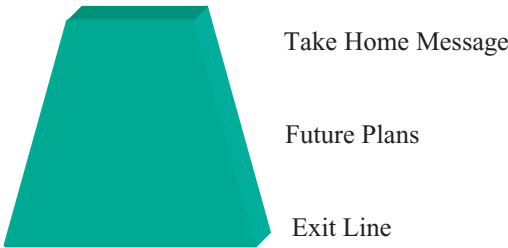


ratio of time needed to describe its contents. Typically, it comprises 75 to 80 percent of the presentation’s length. The speaker reviews conclusions before addressing the next key component, the Take Home Message. This is the single most important idea of the talk, one he wants the audience to memorize.

After the Take Home Message, the hour glass widens out again into the Resolution Section, the third and final portion (Figure 1.4). The heart of this section is future directions and studies or “the story ahead.” Finally, having a predetermined sentence to conclude the talk, an Exit Line, assures a strong and clear finish.

This is but an overview of the Hour Glass Format – the presentation order of a talk. In the ensuing chapters, we look at the model

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from a number of perspectives, not only to elaborate on its composition but also to describe how the components interact. Obviously, before the elements are compiled, they must be created. Perhaps surprisingly, however, we suggest approaching preparation in an entirely different sequence from the presentation order.

**CHAPTER 1 SUMMARY**

A key distinction between writing and speaking is the matter of who controls the rate and flow of information exchange. In an oral presentation, it is the speaker. As a result, the most effective talks follow the principles of good storytelling. The speaker determines the sequence and timing of information so the audience can learn his process in a logical, coordinated and step-by-step fashion.

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## 2 THE FIRST STEPS OF PREPARATION

Theories are nets cast to catch what we call “the world”... We endeavor to make the mesh ever finer and finer.

– Sir Karl Popper, *The Logic of Scientific Discovery* (1959)

**P**erhaps the following preparation process will look familiar to many speakers: After receiving an invitation to speak, the presenter chooses a title; writes the introduction; searches the data; sorts the slides; and finally, summarizes the conclusion points on a slide.

Scott Morgan used to prepare his talks this way. When he attended a presentation, he would hear the title, introduction, data and conclusion points, and assume they should be prepared in the same order.

But there are several drawbacks to this common strategy. First, there is probably more information to share than available speaking time in which to share it. For a speaker to fit her remarks into the allotted time, she must eliminate some interesting and perhaps essential facts. But perhaps the biggest drawback is that she drowns the talk’s central point in the minutiae of excessive detail. As a result, the talk is longer and more detailed than an audience can readily



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accommodate. No wonder the list of common complaints about talks includes “too complicated” and “too much information.”

Mr. Morgan eventually realized that as linear as the preparation process seemed, his own groundwork was actually very different. It was also less time consuming. When invited to speak, he did not begin by writing the title and introduction but instead asked himself, “What do I have to show the audience? What are my best data?”

He had another realization: A week or so after attending a talk, he could recall just one main concept from it. Even when he understood the speaker’s work well and took extensive notes, he easily remembered only one major point.

By combining these two discoveries, we have devised a practical strategy for preparing a talk: working backwards.

Working backwards accomplishes an important objective: It builds the presentation outward from the most important point. As opposed to sifting through copious amounts of material in search of the essential idea, the speaker focuses on it from the beginning.

### Finding the Take Home Message

As discussed in the previous chapter, the most prominent part of a talk is the data. That is what the audience has come to see and hear. The encapsulation of that data is even more imperative, because it underscores the significance of the facts. Thus, the place to begin preparation is to identify the one concept that reflects the combined import of all the data. This is the one thought the audience should memorize: the main point, the gist, or the Take Home Message. All data for the talk should be selected with this end goal in mind. All images should be designed around it. The Take Home Message

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guarantees that the speaker clearly states the most important point in the allotted time, while providing a thematic thread for the entire talk.

As the first element prepared, the Take Home Message helps establish what belongs in the talk and what can be set aside. Starting this way is far easier than beginning with the entirety of the subject and eliminating items one by one. In other words, the Take Home Message acts as a filter. From this point on, everything placed in the talk will revolve around it.

The Take Home Message is not the same thing as a speaker's favorite conclusion point. Rather, it is what the conclusion points mean collectively. For example, the following are conclusion points from one presentation:

**The combination of RNA interference and micro-array profiling is useful for the study of genome-wide functions.**

**GATA-3 is essential for estrogen response.**

**GATA-3 binds directly to the SERPIN A3 gene.**

The presentation's Take Home Message is:

**GATA-3 appears to co-regulate with estrogen receptor.**

The audience may forget the exact tools used or which gene is involved, but they stand a good chance of remembering that GATA-3 co-regulates with the estrogen receptor.

By giving both the conclusion points and the subsequent interpretation of their significance, the speaker renders the essential point of the talk more memorable. Here are some other good Take Home Message examples:

**Cooling of the brain may decrease its tendency for excitation and seizure.**