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WORDS OF ADVICE

How to prepare and deliver a great talk

Rita Gemayel[1] and Seamus J. Martin[1,2]

1 The FEBS Journal Editorial Office, Cambridge, UK
2 Department of Genetics, Trinity College, Dublin, Ireland

Introduction

Giving a talk can be daunting, particularly for scientists at the very early stages of their careers. Standing in front of an audience and speaking for 20–30 minutes do is never easy, and even those who do it for a living often confess to getting nervous before a talk. It is an oft-quoted fact that public speaking ranks higher than dying or jumping from a plane (with a parachute we hasten to add) on lists of 'what people fear the most'. Anyone who has experienced the fear of public speaking knows very well just how stomach-churning the thought of an upcoming talk can be; the dread, the sleepless nights, the thought that nothing will come out when you open your mouth, or even worse, that you will speak complete gibberish. If you have felt this way before giving a talk, do not worry, you are not alone, we have all had these fears at some stage. However, with a bit of preparation, a few tricks, and a bit of experience, giving a talk can be something that you end up relishing and even looking forward to. I know that this seems hard to imagine, but trust us, there is nothing more enjoyable and invigorating than communicating your work and ideas to an appreciative audience. It is literally a huge thrill that energizes you and can leave you on a high for days. Sound good? Well, let us look at how you can put yourself in the best possible position to shine when it is your turn to take the stage.

First off, do not worry too much about getting nervous. We all experience nerves, but the simple truth is that this gets much easier to deal with through practice and by ensuring that you are well-prepared, as discussed below. It is also worth remembering that **becoming an effective and confident speaker is a skill that is likely to be a tremendous asset for any career direction** you decide to embark on in the future. Not only is giving a good presentation and getting immediate positive feedback from the audience extremely rewarding, it can also give you the chance to directly communicate your results to a wide audience. You might spark the interest of a collaborator or a future employer, or a journal editor might invite you to submit your work or write a review. Also, good presentation skills are extremely useful later on in your scientific career [1,2], whether you pursue an academic path (e.g., defending a grant application in front of a grant panel, teaching undergraduate students) or a nonacademic one (e.g., pitching to investors, presenting data to lawmakers).

Just like writing a scientific manuscript [3] or a fellowship application [4] or preparing a poster [5], giving a good presentation is a skill that can be greatly improved with practice and feedback. But this requires more than just conquering nerves. A standout presentation combines three strong elements: **a clear message, well-designed slides,** and a **strong and confident delivery**. In this installment of the Words of Advice series, we tackle these key elements. We will guide you through the process of planning your presentation, designing informative and visually appealing slides, and delivering a clear and engaging message to the audience. We have also made some suggestions for audience members (Box 1), and we could not help but mention a bit of bad advice for preparing presentations (Box 2); advice that we have all heard at some point (and urge you not to follow). As for the advice we do want you to follow, continue reading!

Planning: fail to plan, plan to fail

A very common reaction to finding out that you will have to give a talk is to pretend that it is not going to happen, and to simply bury your head in the sand and put it out of your mind until a week or so before the talk date. While an experienced speaker can get by on an hour or two of preparation (or even a few minutes if you already have the slides prepared), if you are new to speaking in public you will need to **start preparing at least several weeks before the event** to ensure that you give the best possible account of yourself on the day. The advantage of preparing well in advance is that (a) you will know that you have lots of time to get everything done and this helps to calm the nerves, (b) not being in a panic-stricken mode will help

Box 1. Being a good audience member

In the last section of this article, we advised speakers to put themselves in their audience's shoes (read further if you want to know why). Here, we want to flip the analogy. We ask the audience members to put themselves in the speaker's shoes. Things that might seem trivial to you as an audience member, might be very distracting if you are the speaker or another audience member. For example, staring at your computer (or cell phone) while reading or reviewing manuscripts during a talk. It is rather off-putting for a speaker to see how disinterested you are in their talk. Try to be discreet. If you must send emails or have a grant deadline looming, sit at the back or the side of the room so that you are not directly in the line of sight of the speaker. Turn down your computer's volume so we do not have to listen to a whoosh sound every time you send an email. Do not film or take photos of the slides during a presentation unless you have the speaker's permission or it is clearly published work. Although most speakers do not mind sharing their results, it might be highly contentious in some instances. If you have asked the speaker a question, give other audience members the chance to ask their questions too; ask your follow-up questions during the breaks. And although it really seems very obvious to point this out, please do not hold a conversation with a friend or colleague during a talk. If the speaker sees you doing this, especially if they are inexperienced, they can become completely put off as they might think that this reflects a complete lack of interest in their talk, or worse.

Box 2. Words of (bad) advice for giving presentations

- Do not rehearse your talk. Spontaneous talks are much better, just like spontaneous pension plans and spontaneous climbs of Mount Everest. What could possibly go wrong?
- Never start a presentation from scratch. Just cobble together slides from old presentations and explain any key missing diagrams in words as it occurs to you. The audience will figure out what you mean, even if you do not really know what you want to say. Or what you mean. Either way, it will be fun, right?
- Do not waste time adapting your figures for your talk. Just use the ones you made for your paper. Even better if they are all in black and white with tiny fonts. Having attractive and visually appealing slides is irrelevant – the audience is just here for the data, and the more data the better
- Do begin your talk with a slide containing a long list of contributors and collaborators and mention that you are telling us this stuff now because you might forget to do this at the end. All great movies start with a 3-min credits reel telling us who played what role before we have even seen the movie and we absolutely never fast forward through this bit.
- Do not include a message title on every slide. It is really great fun trying to work out what you are showing us. It can be even better fun seeing you trying to work out what you are showing us, on the speaker podium, in real time.
- Do try to cram as much data into every slide so that each piece of data occupies a postage stamp sized area of the slide. Ideally every slide should look like a multicomponent figure in a paper. Then give us 20 seconds to take in all of these data. Believe us, we will absolutely love you for this.
- Even if you are running over by 10 minutes, please feel free to take us through every single slide and every single piece of data therein (even if these are just controls) and then spend 3 minutes on the acknowledgements slide. We all know that you deserve more time than everyone else. And it is fun bludgeoning the audience into submission. They will thank you for it in the bar later.

you to see what you need to do more clearly and help you to avoid making mistakes, (c) it **allows time for you to rehearse and to polish your presentation.**

There are three crucial factors that you should take into account when preparing a presentation: **purpose, audience,** and **time.** As we have previously advised for posters [5], you need to have a clear purpose for why you are preparing a presentation and **what you want your audience to take away from it** (perhaps also what you want your audience to give you). You should adapt your presentation for exactly that audience. The primary purpose of a talk can change depending on the audience; you may need to present your latest results at a conference to find potential collaborators, or you are giving your PhD committee a progress report, or you might need feedback from your adviser and lab mates

on how to move your project forward. Combined with the time allocated for your presentation, these factors will dictate what you must include, and not include, on your slides. Once you have a clear idea of how your presentation should look like, **draft a plan** (see next paragraph) but keep modifying it until the flow and the content make a clear, coherent narrative.

As we mentioned above, a standout presentation should clearly convey the speaker's main message to the audience. So, your plan should be centered around how best to deliver a clear message. **Your talk should therefore be focused on one key concept or idea** that you are discussing. You can make your talk much more complicated than this, but it may not be the better for it. A good way to think of your talk structure is the following:

Tell them what you are going to tell them.
Then tell them.
Then tell them what you told them.

Ideally, your plan will incorporate four key elements, which we will discuss in more detail in the next section:

1 Context/Background
2 Scientific question/objective
3 Experimental approach and data
4 Main message (or conclusion)

The storyboard approach that we advised you to use when writing your scientific manuscript [3] is also very useful when you are drafting a presentation plan. You could roughly hand sketch your slides or draft the plan in PowerPoint or Keynote – adding notes on the slides to remind yourself of what should go on each slide – and modifying the content and order until you get the flow right. This approach will make designing your slides much easier and will save you time. Having a plan also gives you a rough idea of how many slides you will end up with (and whether you should consider cutting down the number of slides you were planning to make).

Before you get into the fine detail of drafting the talk, a useful exercise is to simply write out your talk as a series of keywords that will help you to provide an overall structure your talk. Try not to think of any existing data or introductory slides you already have. At this stage, simply write out your talk plan as a list of keywords that enable you to develop a nice flow of information. Once you have done this, it is then easy to add finer detail within the various sections.

For example:

Title slide
Introduction to Inflammation
Inflammation initiated by infection
Discuss Toll receptors
Introduce the question of whether Toll receptors have endogenous ligands in mammals
Data slide 1
Data slide 2
Data slide 3
Data slide 4
Data slide 5
Recap of what we have found
Implications of our findings
Possible caveats
Future directions
Acknowledgements slide

Background and context

All the background information you include in your presentation should be connected to your scientific question. Think about what will most likely appeal to everyone in the audience and start from there. Ask yourself what your audience needs to know about your subject in order to understand the question you are trying to address and why this is important. Try to balance the amount of background information to allow the audience to understand the motivation behind your work. If you give too little, your audience will not be able to follow your reasoning. If you give too much, your audience will be inundated with too much detail and will become bored, will lose focus and drift off into thinking about what they might get for lunch later. We have all done it. So, when you are preparing a talk, try to imagine yourself as a member of the audience and focus on the **key information** they really need to know in order to understand your presentation. And also remember to adapt the background information to your audience. If you are giving a presentation at a broad scope meeting, you might need to spend more time explaining your model system than if you are presenting at a specialized meeting where everyone is familiar with particular models or experimental approaches. Similarly, for your PhD committee, which will likely include scientists who are not intricately familiar with your field, you will need to include enough background as well as present evidence of progress with your project.

Scientific question

Make your scientific question very clear to your audience. It is worth having a slide where **you clearly state your main objective.** It is very frustrating for the audience to sit through a presentation where they do not understand the motivation behind the work. They will

immediately lose interest and you will probably get very little engagement at the end of your talk.

Experimental approach and Data

Most people will be tempted to include as much data as possible in their presentations. This is a big mistake. While this might be acceptable for a PhD committee progress report, it is counterproductive for any other presentation. **Data overload can antagonize your audience** and completely confuse them. Remember the old adage: **'less is more'**. Your goal is to communicate a clear message to your audience (and teach them something new). So include the strongest data that support your main objective. Any data that incrementally add to the main conclusion can go on backup slides that you could refer to during the questions and answers session. Also, organize the data in an order that allows each result to build on the preceding one, for a logical and coherent narrative. Any tangential line of inquiry will distract your audience from the main message of your talk. Similarly, unless a key goal of your presentation is to describe a new experimental approach or technique, slides filled with extensive methodological data are likely to confuse – and even bore! – your audience. So, try to keep the methodological details and mundane control data slides to the minimum.

Main message

Reiterate your main objective before presenting the conclusions. Make sure that these conclusions are supported by the evidence you presented and then clearly give the audience the take-away message from your presentation. **This is your main task as a speaker.** You could also discuss the implications of your results within the wider context, but do not overreach.

Designing your slides

Your goal as a speaker is to keep your audience's attention and to control what your audience pays attention to. Your slides should be designed in a way that minimizes distraction. Anything that goes on the slides should be essential to your message. And how you display the information is equally important for delivering a clear message. Keep in mind that slides are meant to be visual aids, but they should be understandable on their own, like a poster [5]. Someone in the back of the room who cannot hear you properly, but can still see your slides, should still be able understand your message.

So how do you design slides that deliver a clear message to everyone in the room? Here is what you need to keep in mind:

1 **One slide, one point**. Make sure that each slide conveys one point only. Delivering the information one point at a time makes it easy for your audience to keep up with your logic. If you include too much information on one slide, you will divide the audience's attention; instead, your goal should be to keep everyone on the same page. So, it is better to split the information over multiple slides and go over them swiftly.
2 **Consistent design of all slides.** Try to maintain a consistent layout (e.g., title and figure placements, text alignment…) across all the slides. Use the same fonts and the same font size for information of equal importance, and favor dark fonts over a light background. Consistency reduces the sources of distraction and helps your audience stay focused on the main point of each slide.
3 **Informative title.** The title of your slide should be the main message that you want the slide to convey. Your aim is to make the audience understand the implications of the content, not what the content is. In other words, if you are showing data, the title of the slide should explain what the data mean (e.g., treatment x increases autophagic flux) and not what you have done (e.g., measurement of autophagy after treatment with x). A good title is a complete sentence, with a subject and verb, that will automatically direct your audience to what they should look for on the slide, saving them time and saving you the need to explain every detail. You could ask a question too, but never use 'Introduction', 'Results', 'Conclusions'… as your slide titles. Keep these for your manuscript and also, but not necessarily, for your poster [5].
4 **Custom graphs that are simple, colorful, and uncluttered.** The audience will not have enough time during a presentation to go over every detail in your graphs. So, avoid copying and pasting figures that you have prepared for your manuscript into your presentation. You need to customize your graphs first, while making sure they still communicate their major points (Fig. 1). First of all, change the font size of the axes' labels and titles: use a font size of at least 16 for the titles and at least 14 for the labels. Manually add the legend on the figure to make the information stand out. Draw your audience's attention to key information on the graph by using arrows; but do not overuse the arrows. Combining diagrams with data can also help the audience to quickly grasp complex scenarios (e.g., signaling cascade, gene circuits…); but keep the diagrams simple and accessible.

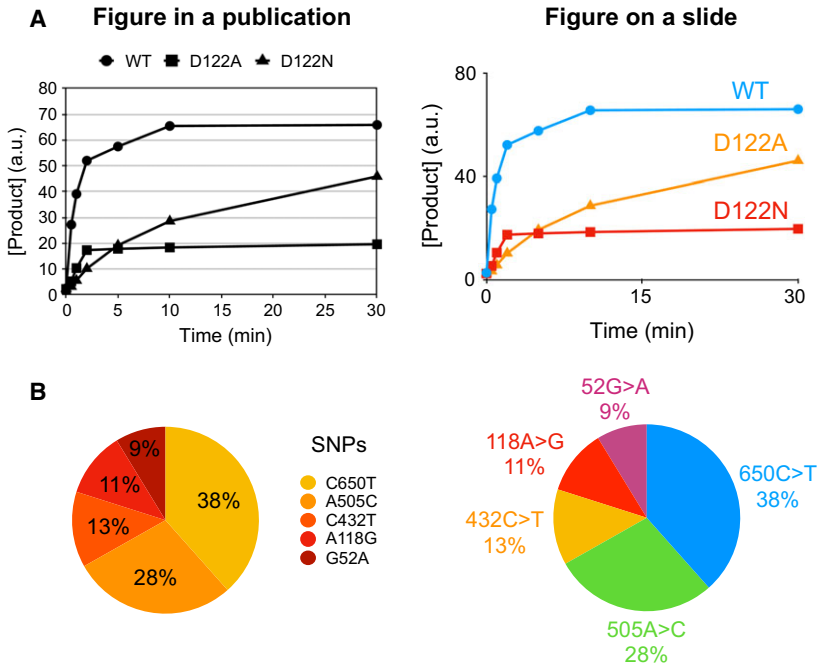

Fig. 1. Tips for customizing publication graphs (left) into simple, uncluttered graphs suitable for a presentation (right). (A) For an XY graph: declutter the axes labels and add the data legends on the figure to make the information stand out. (B) For a pie chart: use different (and vibrant) colors for the data points and their legend. Use a font size of minimum 16 for the titles and 14 for the labels.

5 **Less text, more visuals.** Favor visual elements (figures, diagrams, and images) over text. If you include too much text, the audience will stop listening to what you are saying because they will be busy reading sentences on your slides. Instead, organize the text into short bullet points that are ideally less than half the width of the slide in length. Bullet points belonging to the same group should be of similar grammatical structure. Avoid having complex tables in your presentation. Tables with many columns and rows are even worse than text because they are hardly ever readable. But if you absolutely need to include a table, adapt it for a presentation: only retain the key information, simplify the headers and use alternating colors for the rows.

6 **Effective redundancy or repetition for emphasis.** While designing your slides, think of what you want to say, or highlight about each slide during the talk, and adapt the content or your spoken text accordingly. In other words, the information on the slides and what you say should be redundant. This is not only an effective way to rehearse and polish your talk, but it will maximize the retention of information by your audience because they will see and hear the same thing.

7 **A picture says a thousand words.** Include a good schematic of the pathway or process you are exploring that can be used as a consistent 'motif' throughout the talk. You may use this schematic to initially explain to the audience what problem you are trying to solve, and then at various junctures during the talk you can show this diagram again (or a zoomed version of it) to help the audience understand the implications of the experimental data presented, or to keep them on track if you have a complex argument. A good 'pocket slide' is a single slide that you could have in your pocket at all times to explain to someone what you are working on and why. The key schematic you would have on a 'pocket slide' is the schematic that should recur throughout your talk.

Practice makes perfect

Well-designed slides are only one part of a good presentation. If you cannot deliver your message to the audience, it does not matter if your slides are perfect. So, when you have a good set of slides, **make sure you practice in a room by yourself** and get comfortable with the flow of the presentation and what the slides look like projected on a screen. Work out what you are going to say and generally in what order. Get the words feeling comfortable in your mouth, but **do not try to learn a script.** A scripted talk sounds wooden, veering into 'pre-flight safety announcement' territory, and can end in total disaster if you skip a line or cannot remember what line comes next. It is far better to simply engage with the information you have on your slides and try to tell the story as it logically occurs to you, using your slides as visual cues. This is really very easy to do with a little bit of practice.

Giving a great talk is also about **telling a compelling story.** Do not forget that you are speaking to other humans, who are suckers for a good story. First, you need to hook your audience. Tell them something (related to your work) that they are likely to care about or that will spark their curiosity. Give them a sneak peek of what is coming and try to set your work within the broader context of the field. And start building from there. But do not forget to get to your main objective quickly, as we have mentioned previously, otherwise your audience will lose interest and start checking their email or worse, start staring at you looking confused and in pain. The first few minutes of a presentation are especially crucial. If you lose your audience at this point, you will struggle to regain their attention.

An outstanding presentation also flows naturally. The most important thing that you need to master is the transition between slides. You always need to be one step ahead; to know what is coming on the next slide and to be able to introduce it while still on the preceding one: tell the audience, for example, what they should look for on the figure before you show it to them. Your transitions will then be smooth and the audience will easily follow the narrative. As we mentioned earlier, never try to memorize word-for-word what you plan to say; otherwise if you forget a line, you will be thrown completely off balance and it will be very difficult to get back on track. **Only memorize the key points** and what you need to emphasize on the slides. That way, the presentation will come across as fresh and unscripted.

To succeed in driving home a clear message, you also need to **put yourself in your audience's shoes.** A piece of information that might seem trivial to you, could be crucial for the audience to understand the thrust of your argument. Remember, **the conference room is not going to be full of experts** on your specific topic. So do not make the mistake of preparing your talk only for the handful of experts that might be there. You are aiming to communicate with the whole audience. So **keep jargon to a minimum** and know when to get into details and when not to.

When you have practiced on your own a few times and have ironed out the obvious bugs in your presentation, then practice your talk in front of your PI and lab mates. They are the best proxy for your audience and will help you to identify where you need to improve the clarity of your presentation. Be prepared for lots of advice at this stage. You do not have to follow all of it, but you will find that many points fall into the same key categories. Listen to the feedback comments, write them down, think about them, and then finalize the talk with these points in mind. But **stay true to what comes naturally to you.** One size does not fit all. There are many different ways to give a great talk while still keeping the points we have made above in mind.

Another useful tip that will help you master your presentation, is to practice it once without the slides. If you can tell the story you plan to present, clearly and without having to refer to your slides, you will be able to give a compelling talk instead of just explaining what is on your slides. Someone sitting in the back of the room, who cannot see your slides properly, but can still hear you, should be able to understand your message. And remember, your slides are only visual aids. You should refer to them only when you need to direct your audience's attention to certain details; otherwise you should be addressing your audience at all times. If your slides are well-designed, the information will be easy to find.

Think of possible questions that you might get from the audience and prepare how you will answer them. Have backup slides at hand to support your answers. Listen carefully to the questions and take your time to think about your answers. This will help you formulate clear and coherent answers. Make the audience feel like you want them to understand your presentation. Your audience will leave your talk with a positive opinion of you and your work if they understood your message and have learnt something new.

The day of the talk

Make sure you **check out the room where you will give your presentation well beforehand,** if you can. If possible, go up on the stage itself to see what the room looks like from the perspective of standing there at the speaker podium. This can be very helpful and can make you much more comfortable when you actually take to the stage, because you are already familiar with how it feels to stand there. When you visualize yourself performing a task in a specific environment – a technique used by athletes – it will allow you to create a mental image of what is going to happen when you will actually perform this task. This has a surprisingly calming effect and you will feel more prepared for the task ahead.

Upload your presentation before the beginning of the session and make sure that all the slides are displayed correctly. Have your slides as a PDF too in case you run into compatibility issues.

Experienced speakers often develop a 'pretalk routine' to calm the nerves and feel relaxed and confident. **Your pretalk routine should put you 'in the zone' for**

standing up in front of an audience. For example, going for a good run, a long walk, practicing yoga, or having a workout in the gym, a few hours before your talk can really relax you and make you feel empowered. It can also help to pace around at the back of the room (or just outside) 10 min or so before your talk, as this can get your energy up and your engine revving. Whatever you do, if you are feeling nervous, do not just sit in the audience prior to your talk feeling like you are waiting to be called in front of the firing squad. Get moving around and prepare to put on a good performance. Remember that **your audience is just people and that they want you to do well.** Really. Everyone loves to hear an interesting talk and to be impressed by a speaker they have not heard before. So, do not be scared of your audience, and it really pays to remember that many of them will not be experts on the topic of your talk and that you are likely to know much more about your subject than they do.

When giving the talk itself, **face your audience and not your slides.** Of course you will need to turn toward your slides from time to time, but do not orient yourself so that your back is to the audience or such that you are permanently looking at your slides. Try to use hand movements to be more active and engaging. Try **to modulate the tone of your voice** to keep your audience interested. Move around the stage if you are relaxed enough. Do not be afraid to stand in front of the podium rather than behind it (you will need a handheld slide remote as well as a radiomic for this). Remember that humans read body language in addition to listening and looking. Hiding behind the podium, especially if all that is visible is your head, can make your presentation feel disembodied and somewhat remote. Do not worry if some of these things seem daunting when giving your first presentation(s); as you grow in experience and become more relaxed, you can incorporate some or all of these 'special features' into your talks.

Above all, **have confidence in yourself and enjoy your moment in the spotlight.** One day you will realize that you love to be invited to give talks and may not be able to imagine why someone would feel nervous giving a talk about what they love. It really can be a hugely rewarding and enjoyable experience. Come on, who does not love to show off a bit every now and again?

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