

Guidelines oral presentation

Valid from September 2023

An important aim of the Biology curriculum is to prepare you for a (scientific) career. In order to do so it is not only important to be able to plan and perform experiments, but also to communicate the knowledge that you gained through these experiments. Besides communication in the form of writing, verbal communication is of utmost importance. After a good and structured scientific presentation your audience understands:

- the aim of your research and why this aim is important to your field of research
- what kind of experiments you performed to accomplish your aim
- the implications of your results on your field of research

The skill to present a topic in a well-structured way is of benefit to you in the world of research, but also outside academia, during job interviews and everyday life.

The following guidelines are the **general guidelines** that apply during the Bachelor Biology at Radboud University. **Criteria may however differ between courses**. Therefore, always be sure to check if there are specific criteria presented by the course coordinator.

Prior to making a presentation

Structure

In order to be able to transfer knowledge to an audience, the structure of the presentation is key. Before structuring, all data needs to be collected and analysed, results should be visualised (drawings, graphs, tables) and conclusions should be drawn.

After collecting all the necessary information, you will start with formulating the **main message** (or messages) of the presentation. What do you really want your audience to remember? Based on the main message of the presentation, the information can be selected that is required to convey this message. Be selective; not all your results or conclusions have to be included in the presentation. Only present the parts of the materials and methods, results and conclusions that will help you explain this main message. If certain information makes your presentation unnecessarily difficult or if it distracts from your main message, you can consider to leave it out of your presentation. This could mean leaving out parts of your research that you would normally include in a report. At the same time it is important to adjust the selection of information to the time that is allocated for the presentation.

The structure of the presentation should aim to convey the main message in a **logical and coherent** way. Note that the presentation does not have to follow the chronological order in which the experiments were performed. Organize your subtopics in an order that makes sense. This is the structure that you will use during the base (Materials and Methods, Results and Discussion) of your presentation, but is often the logical order in your Introduction and Conclusions as well.

Transitions

The content of the presentation will already ask a lot of the concentration of your audience, which makes it difficult for your audience to understand the structure of your presentation if you do not support them in doing so. Therefore, it is important to **explain the order of your subtopics** at the end of the Introduction (also see Content of your presentation) and to **present clear transitions** when you switch from one subtopic to another. This way your audience knows when one part ends and another one starts. It is important that these transitions link the different subtopics. If the structure of the presentation is logical, this will also help drawing up the transitions between subtopics.

- Incorrect: “This was topic A, now I will move on to topic B.”
- Preferably address their relation to each other, for instance “As we saw an effect of herbivory on plant growth in our greenhouse experiment (topic A), we decided to see if this also holds true in a field experiment (topic B).”

Clarity

As mentioned, it is difficult for your audience to focus on things other than the content of the presentation. Be aware that unlike in a report, your audience cannot ‘reread’ an explanation during a presentation. Therefore it is important to **emphasise the clarity of your talk**. You can lose your audience by referencing to previous statements, figures and abbreviations; does your audience still remember what they were? Even if you explained in your Materials and Methods what ‘the first experiment’, ‘high dose’ or ‘level 2’ was, you cannot expect your audience to know the exact difference between them and ‘the second experiment’, ‘low dose’ and ‘level 1’. Instead of these kind of references, try to refer to your experiments and treatments in a way that holds relevant information such as what the experiment was about or the actual height of the dose that you used. If you showed a (schematic) image of your experimental set-up during the Materials and Methods, you can also support your audience by using that image as a ‘map’ during later sections. You can do this by projecting the image in the bottom right corner and by keeping your audience updated about on what part (e.g. treatment) of the image you are currently talking.

Language – General rules

Unlike with papers where you do not necessarily know who will read it, you can have a good idea of what kind of audience will attend your presentation. Therefore, you can and should adjust the level of your presentation and the language you use to your **audience**

During a scientific presentation consider the following instructions:

- Do not use **telegram style** in speech, but on slides do use limited words.
- Be cautious of using **informal or non-scientific words** that you would use in a normal conversation. **Metaphors** are a helpful tool in explaining matter and can be used where they add to the clarity of the presentation, but they should be an addition to and never a replacement of the explanation of actual processes and mechanisms.

- The use of **(standard) abbreviations** should be limited. When you really want to use an abbreviation, make sure that your audience either has knowledge of the abbreviation beforehand or make sure you address the meaning of the abbreviation more than once to make sure that it sticks in your audience's memory. Show the abbreviation on your slide.
- Only use **numbers** (1, 2, 3, etc.) on your slide when followed by a unit (mg, mM, etc). In other cases, numbers are written as words (one, two, three). Always leave a space between numbers and units and use decimals (0.5) rather than fractions (½).
- **Scientific names of organisms** are always written in italics, for example: *Escherichia coli* (note that the genus name always starts with an upper case letter and the species name with a lower case letter).

Language – Correct use of verb tenses¹

An important aspect is the correct and consequent use of verb tenses. Note the same rules apply for oral presentations as for written reports.

- When reporting on **truths or conclusions**, use the present tense (introduction and discussion section).
 - “Cells are the smallest functional units of the human body.”
- When referring to the **results or conclusions of other studies** (introduction and discussion section), the present tense could be used. The past tense could also be used.
 - “Jansen et al. (2011) have shown that some bacteria grow better at 65°C than at 37°C.”
 - “Jansen et al. (2011) showed that some bacteria grow better at 65°C than at 37°C.”
- When the **subject of the study** is described, the past tense is used (introduction and discussion section).
 - “In this study the growth of bacteria at different temperatures was observed.”
- When **describing experiments**, (material and methods section) and when **describing results** (results and discussion section), the past tense is used.
 - “Bacteria were grown at 37°C.”
 - “Bacteria grew exponentially at 37°C.”
- For the **interpretation of results**, the present tense is used (results and discussion section).
 - “The results show that bacteria grow better at 37°C than at 65°C”.

¹ from: Malmfors B., Garnsworthy P. and Grossman M. (2004) Writing and Presenting Scientific Papers, 2nd ed. Nottingham University Press, Sheffield

Describing results, interpretation of results and referring to other studies, could in this way lead to the use of several verb tenses in one paragraph ('Discussion'). For example: "On average, A was higher than B, which means that A has a greater part in the ecosystem. This is consistent with the results of Pietersen et al. (2012), who found that A is the dominant species."

Slides and Layout

Rules on layout for a presentation are less strict than for a report (leaving more room for creativity), however layout should never be a distraction. Therefore it is important to keep a few things in mind:

- **Limit number of words per line and the amount of lines per slide.** Use **short, bulleted points** and try to limit the amount of lines to a maximum of 5-7. Do not use entire sentences (the only exception is when you use a literal quote of someone); a few keywords per line is sufficient in most cases.
- Stick to **one style** (background, colour scheme) that is not too busy. Use easily visible colour combinations.
- Be careful with the **outer margins of a slide**. Some parts may fall outside the screen when projected. Additionally, do not use the bottom 10% of your slides, as they might not be visible for people at the back of the room.
- Use **fonts** that are easily readable. Calibri, Arial and Helvetica are examples of good fonts. Make sure to pick a **font size** that is large enough to read from the back of the room.
- Think of ways to **visualise difficult information** rather than putting down text, e.g. via pathways or flow charts. This will deepen your audience's understanding and makes it easier to remember.
- Make sure your **illustrations** are easy-interpretable and that the essential elements are indicated
- **Figures:** although graph titles are not used in reports, they are fine on a slide. When copying a graph from Excel or Word, make sure to enlarge the fonts to improve the readability. Make sure that the differences between different lines and symbols is easily visible.

Additionally, it is important to keep in mind that your audience will read all the information that is available to them. Therefore, if all the information on a slide appears at once, this will form a distraction to your audience. To avoid this, make sure to **synchronise the information in your talk with the appearance of information on your slides**. This can be done by using the animation type 'appear' in PowerPoint for both text and images. If an image is not relevant anymore, you can prevent it from becoming a distraction by removing it (using 'disappear'). By using animations in this way it can also support you as a presenter, as it can help you to cue what you were going to tell next. In your results section you could for example consider using separate animations for different data points within your figures, or have arrows appearing to point at the part of a graph that you are talking about. If you do so, keep in mind that this may also form a distraction if you use it too much. Also, do not use distracting types of animations.

Plagiarism

A scientific presentation uses peer reviewed sources, such as Web of Science, PubMed or Google Scholar. Presenting conclusions and/or results from the work of others, without proper citation, is considered plagiarism. However, the rules on citing other publications are less straightforward in presentations than they are in written reports. As a **guideline for using literature and citing** you can use the following points:

- If a **bulleted point** is based on literature, place the name of the authors and year of the publication between brackets at the end of the bulleted point, e.g. (..... et al., 2001). Write down the full citation in the 'notes' field associated with the slide.
- Place **references of images** you use from external sources below the image (small font) or in the 'notes'.
- **In speech**, referencing is less strict. When you make extensive use of a source you can name the authors, otherwise a phrase such as 'literature states that...' will suffice.
- In some cases mentioning the source of your information is beneficial to your story. For instance, if your research is important because of certain legislation, it can help to refer to this legislation and the corresponding authority.

In addition, copying complete sentences from literature or digital sources is also considered plagiarism, even when adding a reference! Always put the information you find in your **own words**. If you want to use a **literal quote**, put the quote on your slide between quotation marks (".....") together with the name of the author. Plagiarism will always be reported to the Examination Board, after which they decide what penalty will follow.

Content of your presentation

- Opening and Title slide
- Introduction
- Body
- Conclusions and Close
- Questions

Opening and Title slide

The first and last few sentences of your presentation might be the most important ones. They offer you the opportunity to grab your audience's attention with just a few words. Use an **attention grabber during your opening** to engage your audience. A good attention grabber is one that is relevant to your presentation and will create a need for your research, while being appealing to your audience. It can be as simple as mentioning the problem that you are addressing in your research. Starting a presentation by stating your name and the title of your research might be relevant, but is not appealing. Examples of attention grabbers are quotes, questions, anecdotes, a statement or a picture. It is possible to create a separate slide for your attention grabber.

Your **Title slide** contains some general information and concludes your opening before moving on to the Introduction. The top of this slide will contain your **title** (in a big font). Other information that belongs on a Title slide is the **date**, your **name(s)**, **student number(s)** and the **name of your supervisor** (if you had one). If you have a nice picture of your project, you can place it on this slide as well. While showing the title slide, briefly introduce yourself and your topic.

Introduction

The introduction of a presentation is similar to the one in a report. Provide **relevant background** to your work in a **funnel shaped** way; start by putting it in a broader context and narrow it down along the way. Include all the information that your audience needs to understand your work. During the introduction you will elaborate on the **context of your work**, the **relevance**, your **aim / research question** and your **hypothesis**. Be concise and unambiguous. Part of the context or relevance can already be included in your attention grabber. Conclude your introduction with a **preview on the structure of the body**. This preview will show your audience in what order you will go through different topics. This does not merely encompass stating the structure of your body, but also the logic behind that structure. Furthermore, the order of 'Materials and Methods – Results – Discussion' is considered to be known to scientific audiences. So do not focus on explaining that you will move on to the Result section after the Materials and Methods, but rather focus on the order of the scientific content that you will address.

- Incorrect: "After my Materials and Methods section I will move on to the Results section".
- Correct: "First I will discuss the most notable RNA expression differences between skin and limbal stem cells. Since the epigenome is driving transcription, next I will discuss which epigenetic marks and cis-regulatory regions highly correlate with the identified expression differences. Finally using the identified cis-regulatory regions and motif enrichment, we can uncover which Transcription Factors are driving the differences between these cell types."

Body

The body of your presentations consists of your **Materials and Methods**, **Results** and **Discussion**. It is important to decide how you want to structure your body. Most important is to consider what structure will make your story the easiest to comprehend.

- You can choose the **same structure that is used in a report**, where the Materials and Methods, Results and Discussion are separate blocks. In that case you will finish the entire Materials and Methods section before moving on to the Results and finish the Results before starting on the Discussion.
- Especially if your research consists of multiple parts, another option could be to use your **subtopics** as the main building blocks of your body; you will address the Materials and Methods, Results and Discussion of topic 'A', before moving on to the Materials and Methods, Results and Discussion of topic 'B'. This way, when you are finished talking about the results of a graph, you can start discussing those results in relation to other results and literature while the graph is still shown on your slide. This can help your audience to better remember what your results were when you start to discuss them. A downside could be that the different topics feel less connected to each other, so make sure that you create logical transitions between the topics and that you link the different parts of your research when discussing it.
- It is also possible to use an intermediate structure or a completely different structure.

Materials and Methods

This section describes **how the experiment(s) were conducted in a concise way**, with less details than in a report. Your audience should be able to understand what you did, why you did it and how the experiments are suited to answer your research questions. However, your audience does not have to be able to perform the experiment themselves based on your presentation. Where applicable, you can use pictures or schematic images to show what you have done. A schematic image can be especially helpful when explaining your experimental setup. If this is not yet addressed in your Introduction, explain why you picked a certain model organism/study site/other. Explain the methods that you used to measure your parameters and mention the sample sizes you used. Mention the different **statistical analyses** that you performed and explain how they fit your data sets.

Results

The Results section of a presentation is similar to that of a report. You will present your results using figures (graphs or drawings) and tables. Try to use figures where possible as they are faster to interpret than tables. Before discussing a figure or table, remind your audience of the corresponding **hypotheses**. Afterwards, **guide your audience through your figure/table**. Remember that your audience has no clue what you are going to show them, so take your time explaining it; explain the variable on the x- and y-axis and explain what the different lines/columns/colours mean before you move on to pointing out the relevant patterns and differences that you found in your experiment.

It is easy to just copy paste your figures/tables from your report, but often it is beneficial to spend some extra time on it. A figure/table that is used in a presentation needs to be as **easily comprehensible** as

possible. Remove unnecessary information and data from your graphs and only present the important bits. Furthermore, follow the tips as mentioned in '**Slides and Layout**'

Discussion

The Discussion section of a presentation is similar to that of a report. The discussion of your results is perhaps the most important part of your presentation as this is the section where everything comes together (the different experiments, their results and their implications). Use the **main conclusions** that are drawn from your results by integrating them with each other and with results from **literature** and **discuss how this relates to your aim and hypotheses**. If your results are unexpected, try to use literature to find an explanation for the unexpected outcome. Explain the **relevance** of the outcomes of your work to your field of research (and society). Does it fill up a knowledge gap, create new insights or does it confirm/refute other published work?

Conclusion and Close

During the Conclusion you will give a **concise summary of your conclusions**, while **linking these to your research question/aim and your hypothesis**. Additionally, these conclusions should clearly show the **relevance** of your work. If your Discussion led to certain knowledge gaps, this is also the place where you could suggest a **follow-up study**. In your Conclusion, either create a coherent story with logical transitions between the different conclusions or list the conclusions one by one.

At the end of your Conclusion you will work towards your **Close**. A strong Close is one of the things your audience will remember from your presentation.

- Incorrect: "This was all I prepared"
- OK: "This was my presentation, are there any questions?" or "Thank you for your attention"

However, these ends do not really make an impression on your audience. Announcing the end of your presentation is not the most subtle end. The strongest way to end your presentation is with a sentence that actually creates an end to your presentation, without you telling your audience that it is the end. Depending on the rest of your presentation the best way to do so could be to **return to your attention grabber**. Either repeat your Opening, finish it or answer it (if it was a question). By returning to your first sentences you can show your audience that the circle of your information is completed and thus your presentation is at an end.

- Correct: "At the start of my presentation I asked the question which transcription factors are driving the differences between skin stem cells and limbal stem cells. After our multi-omics analysis we found the most important transcription factor driving the limbal stem cell fate is PAX6, using this knowledge in regenerative medicine might uncover new treatment options for patients with limbal stem cell deficiency."

Questions

In most cases there will be time for some questions after your Close. Prepare answers for questions that you expect. As you cannot tell every detail during your presentation, make sure that you still remember the things that you deliberately omitted from your presentation during the information selection. You could **create 2-3 extra slides at the end that help you answer some expected questions**. When answering questions keep the following things in mind:

- When responding to someone, **repeat/summarize the question** to make sure that your entire audience knows what the question was. In doing so, you can also check with the person whom asked the question that you fully understand what was asked.
- **Listen to the entire question before answering.**
- **Answer to the entire audience** and not just to the person asking the question.
- If you are not completely sure about what the question was, go ahead and say so.
- If you do not immediately know the answer, **take your time** and think about it for a few seconds.
- If you do not know the answer to a question or if you are not completely sure about it, do not pretend that you are. If you end up to be wrong this will harm the credibility of your presentation. Instead, let the audience know that you are not completely sure, but that your **hypothesis** is , **because of** (so support you hypothesis with reasons why it could be correct or wrong)..... This way you can show that you are able to think on an academic level even if you do not know the answer. If there is no straightforward answer, another option is to **show the different sides or viewpoints** that are possible.

Rehearsing and delivery

Practise your presentation a few times until you feel familiar with it. If you want **feedback** on your presentation, practise it with a group or record it and watch it yourself. However, be careful with an over rehearsed presentation, as this could lead to a less spontaneous delivery and limits flexibility. It is advisable to fine-tune your presentation every time after rehearsing.

When practising your presentation, check if it is in line with the **duration** that is available to the presentation and adjust the amount of information in your presentation accordingly. Note you do not have to adhere to the set duration by the second. Generally, your presentation should be the set time +/- 10-15%.

Often presenters put too much information on their slides and in their talk. For your audience this can lead to an overload of information, which makes it more difficult to understand the main message. Therefore, do not be afraid to **cut in your information load** after practising and do not make a correction by speaking faster.

When you keep forgetting a certain detail in your presentation, add an extra image or a bullet point in your presentation that can cue you when to tell that detail. This way your **slides can help you memorising your story**.

When you prepared your slides on your own laptop or computer, make sure that your presentation works on the computers at the university.

Presenting and (non-)verbal communication

This section forms a guideline for the delivery of your presentation. However, the way you want to prepare and execute your presentation can differ from person to person. Therefore, read it for what it is; a guideline and not a set of rules. Use them to improve your presentation, but also **find a style that suits you and that you feel most comfortable with**.

If you really want to improve your delivery, try to pay attention when you attend a presentation of a lecturer or a fellow student. Unlike asking for feedback on your own presentation, **getting feedback from watching other peoples' presentations** is something you can do almost every day. What do you like or dislike in their presentation? Pay attention to how they use their PowerPoint, their pointer, the rate in which they speak. Do they use a pause at certain points in sentences? Are they deliberate or is the presenter searching for words? Are these pauses well timed or inconvenient? Do the speaking rate and (lack of) pauses give you a relaxed feeling or do you feel rushed? How is their posture and use of gestures? When looking at others, be aware of the following two questions that can help you improve your own presentation skills:

1. Are there things that other presenters are doing that I could also incorporate?
2. Are there things that other presenters are doing that you dislike, but that you might be doing yourself as well?

Verbal communication

Your verbal communication is an important part of how your presentation is received. Keep the following points in mind:

- Try not to speak too fast as this will heighten the information loading of your audience and make you hard to understand. You can help yourself in doing so by **not jamming too much information** in your presentation. When **speaking slower** it is also easier to clearly pronounce words. However, also beware of not speaking too slow.
- **Pauses** can be used to emphasize the words that follow on the pause, and give your audience the chance to process the information you just presented them with.
- If you are talking towards your slides or towards people on the first row, you are hard to hear for the people in the back. Give yourself the feeling that you are **talking to the people at the back of the room** and everyone should be able to hear you.

- Try to find out if you have any **distracting fillers or filler words** by practising your presentation with a group or by recording yourself. If you are aware of your fillers, you can try to limit the use of them if they are considered to be distracting.
- You do **not have to read your slides** to your audience. They will read it anyway.

Non-verbal communication

Your posture, gestures and eye contact are all important factors in your non-verbal communication. Your non-verbal communication can support your story or distract from it.

- By looking at people you can give them the feeling that they are involved. Do not just stare at one person, but **scan the room**. Looking at the ground can make you seem indifferent or bored and looking at your slides will make you hard to hear. Using notes will also limit the amount of eye contact that you can have.
- The **use of your hands** is very important during your presentation. Do not cross your arms or put them in your pockets, as it will make you seem bored. Putting them behind your back can give you an air of authority, which is not necessarily positive. Do not use your hands to fumble your hair or your jewellery. If you are afraid that you might do so, remove that piece of jewellery. Instead, leave your hands at your sides or clasp them together in front of you. When you have your hands in front of you they are ready when you want to use gestures.
- **Gestures** can be used to emphasize important words, a start, an ending or a transition. They will make your presentation more dynamic and can keep your hands from doing other things. However, keep a balance. Overusing gestures can make you appear nervous.
- **Breathe towards your belly**. This will make you feel more relaxed. Breathing towards your chest will make your voice weaker and more rushed. Breathing towards your belly can help you achieve a calm strong voice.
- Keep your **back straight** and your **shoulders down**. It will release some tension from your body and makes you seem more relaxed. By standing straight it is easier to breathe towards your belly. Furthermore, a more confident stance will unconsciously make you more confident. If you are not sure if your shoulders are in a relaxed position, lift them up and let them fall down. This way they will end up in the right position.
- Plant your **feet apart at about shoulder width** and **distribute your weight evenly on each foot**. Try not to wobble too much.
- **Know where you want to stand** during your presentation. Do not stand directly in front of your slides, as it will limit your audience's view, plus you will be standing with your back towards your audience if you want to point out something on your slide.
- Use the **pointer** to indicate what part of a figure you are talking about.

Nerves

A lot of presenters are struggling with their nerves before and during their presentations. Although a bit of stress can help you perform, too much of it can have a negative impact. Note that although it is not always obvious, **every speaker has nerves**. Furthermore, the shaking hands and vibrating voice are a lot more obvious to you than it is to your audience, so try not to be overly concerned about it.

Your mindset can have a large impact on your stress level. Try to **be positive and ignore negative thoughts**. Affirm yourself that you are relaxed, confident and that you can do this. Even if you do not believe it, it will have a more positive effect than doing the opposite. The realisation that you are feeling stressed can often make you more insecure and thus extra stressed. The previous tips on (non-)verbal communication can also help here; realize that everyone is stressed and try to stay as positive as you can. Realize that stress caused by excitement can feel quite similar to stress caused by anxiety, the feeling is not necessarily a bad one. You could even tell (or lie to) yourself that you are excited to do your presentation.

Another way to cope with your stress is to **limit uncertainty**. Make sure that you are well prepared. If you tend to forget your speech, create PowerPoint slides that help you cue what you have to say. If there are parts of the presentation that you tend to forget during rehearsals, tweak that part of your slide until it fully supports you. If you still do not feel secure about it you can always bring some backup notes. Try not to use these notes from the beginning, but make sure you can reach them in case they are really necessary.

And last but not least, do **realize that your audience does not know what you want to tell them** during your presentation. Even if you forget a piece of information, it is not likely that your audience will notice.