Writing a research report

You can also view this guide as an interactive tutorial: Writing a research report [interactive tutorial]

Purpose of this guide

What does this guide do?

This guide introduces each section of a research report. You'll find out the purpose of each section, and tips for the content and structure.

How to use this guide

The guide is designed to be used in two ways. Either, you can work through it, completing the tasks, as though it is a workshop. Or, you can use it as an information source and select information from it as you need it.

It'll be helpful to have a journal paper from your field to look at as you go through the guide.

Research report structure

Research reports generally follow the same structure. There are four key sections, each with a different purpose. This structure is used in student assignments and published journal papers.

- **Introduction**: explore the context and justification for your study and state the research questions and hypotheses
- **Method**: give enough details of what you did, so that someone else could replicate your study
- **Results**: objectively present the findings of your research.
- **Discussion**: explain what findings mean in terms of the research questions and the literature.

Introduction section

The purpose of the Introduction is to **establish the context** for your study. It tells the reader what they need to know to be able to understand your research, by summarising what is already known about this field and showing how your study contributes to this.

Structure

The structure of the Introduction moves from general to specific:

- background information
- summary of previous research
- details of your study

Headings usually aren't needed in the Introduction, but they can be used.

Background information

The first paragraph gives the key background information needed to understand your research:

- introduce the broad topic
- define or explain key ideas or concepts
- if needed, narrow the scope to your particular research area

This extract from *Additive effects of Na+ and Cl– ions on barley growth under salinity stress* (Tavakkoli et al., 2011) gives background information about the problem of salt in soil:

"The yield of grain crops over large areas of the world's farming land is limited by a number of physicochemical constraints in the subsoil including salinity and sodicity (Rengasamy, 2010). Attempts to develop viable management options to improve productivity of saline–sodic soils, such as irrigation and drainage, have met with minimal success to date. The use of breeding to develop better-adapted crops with improved physiological tolerance to saline-sodic soils offers a strategy for managing crop production on these soils. Improving salt tolerance of barley (Hordeum vulgare L.) has been of interest for a long time and has resulted in a considerable body of data from studies using physiological (Cramer et al., 1990; Munns and Rawson, 1999; Munns et al., 2000; Tavakkoli et al., 2010,b), genetic (Mano and Takeda, 1997; Ellis et al., 2002), and cytogenetic (Forster et al., 1997) approaches."

Summary of previous research

Most reports include a summary of previous research, to show the context of your study. In some subjects, this appears in a separate Literature Review section. How much information to include depends on your topic - very technical or more theoretical topics might have a very short summary, more practical topics will have a longer summary.

What do we already know about the topic?

- Summarise the key ideas within the topic. These will come from module readings and your own further reading.
- We don't want a repetitive list of summaries of individual sources - instead, group similar ideas or findings together.
- Give a complete representation of previous research, don't just include the findings that support your hypothesis.

What needs to be investigated further?

- What is not known in the area, or needs to be clarified?
- What is the gap in the research that your study investigates?

This extract from *Fin whale singing decreases with increased swimming speed* (Clark et al., 2019) synthesises information about humpback whale singing from multiple sources, and highlights a possible gap in the research:

"For humpback whales (*Megaptera novaeangliae*), in which singers are also known to be males [11,12], several hypotheses have been suggested in which assessment of male singer quality involves measures of song characteristics (e.g. number of phrase types, song duration) assumed to be directly related to a singer's physical condition [13–15]. However, no hypothesized relationship between singing behaviour and male quality (e.g. physical stamina) for any baleen whale has been demonstrated with empirical data."

Details of your study

The last part of the Introduction moves from previous research to your study. This should follow on from the gap in the research that you identified.
Tell the reader what you investigated, and an idea of how you did it:

- state the aim of the study, research question and hypothesis
- give a brief overview of the general methodology

The key here is to be brief - you'll go into more detail in later sections. The idea is to give enough detail to frame your research for the reader as they read the rest of your report.

This extract from *Students Weigh In: Usability Test of Online Library Tutorials* (Held & Gil-Trejo, 2016) gives the research questions and on overview of the methodology:

"This study used a multimethod usability test (user test) to assess the effectiveness of the following research questions:

- Did students learn?
- How could the tutorials be more effective?
- How should the tutorials be offered?

A pre- and post-test measured how effective the tutorials were for student learning. Surveys and focus groups illuminated several affective and design questions to determine how the tutorials met students' needs and indicated where students felt the tutorials could be most effectively employed."

Method

The purpose of the Method section is to present **what you did**, and why you did it.
You'll plan your methodology in advance by looking at previous studies, course materials, textbooks etc. It's one of the first things you do in your research, so this is often the first section that people write.

- Include enough detail so that someone else could replicate your study.
- Visual elements can help present your method clearly. For example, summarise participant demographic data in a table or visualise the procedure in a diagram.
- Show critical analysis by justifying your choices. For example, why is your test/questionnaire/equipment appropriate for this study?
- If your study requires ethical approval, include these details in this section.

See *Tables & Figures* for more information on presenting data visually.

Structure

The method section usually has a very clear structure with subsections for each aspect of your study. Which subsections you'll include very much depends on your particular study.

Some subsections that are commonly included:

- **Who or what you investigated:** details of the participant groups, animal or plant species, or anything else that was the source of your data.
- **Equipment**: details of physical equipment, stimuli, chemicals or other equipment used. Put each piece of equipment in its own subsection.
- **Materials**: details of the test, task, questionnaire, interview questions, etc. Put each one in its own subsection.
- **Procedure**: a step-by-step description of how data were collected.
- **Analysis method**: details of analysis software and tests used.

Subsections are usually ordered chronologically:
before: everything you need (participants, equipment, materials etc.) → **during**: procedure → **after**: analysis

The Methods section of *Bilingual language exposure and the peer group: Acquiring phonetics and phonology in Gaelic Medium Education* (Nance, 2019) contains these subsections:

- Participants
- [Phonological] Features analyzed
- Data collection
- Phonetic analysis
- Statistical testing

Writing style tips

Use tenses appropriately:

- past tense to describe the procedure, as this has been completed.
- present tense to talk about information that will remain true after your study; eg., questionnaire or test details

In this example, past tense is used to describe the finished procedure (*administered*) and present tense is used to describe the content of the questionnaire (*contains*, *measure*, *includes*):

> The Abbreviated Time Management Indicator (ATMI) (Roberts et al., 1999) contains 36 six-point Likert Scale items which measure six aspects of time management. The questionnaire administered in this study includes items relating to three of these aspects: meeting deadlines, mechanics of time management, and propensity to plan.

Focus on the study: avoid describing the procedure in terms of what you did - instead, focus on what happened.

- Focus on you: I asked participants to complete the questionnaire online.
- Focus on the study: The questionnaire was administered online. OR Participants completed the questionnaire online.

Be concise: your goal is to be clear and concise. Don't include unnecessary phrases or things that are obvious as this makes your points less clear.

- The items assess whether or not participants agreed with a given statement. → Items assess participants' agreement with a statement.
- Participants who took part in the study were asked to complete the survey. → Participants completed the survey.

Results section

The purpose of the Results section is to objectively present the findings of your study - **what did you find out?** This section is an objective presentation of your research findings. Don't explain the results in detail here - you'll do that in the discussion section.

- Include appropriate summaries of data and the outcome of statistical testing or other analyses.
- Highlight key findings in the text, and provide more detail in tables, or figures.
- You can include additional non-essential data in an appendix.
- If findings don't align with your hypothesis, you should still include them.
- You can make very brief comments on the implications of the findings, but the main explanation goes in the discussion.

See *Tables & Figures* for more information on presenting data visually.

Structure

There's no set structure for the results section - choose a structure that is logical for your methodology and findings. Subsections and headings can be useful to show your structure clearly.

Possible structures:

- By **instrument**: present results from each test, survey or other data collection method in a logical order.
- By **research question**: break down results for each research question
- By **data type**: eg, quantitative findings then qualitative findings.

The Results section of *Teacher Language Background, Codeswitching, and English-Only Instruction: Does Age Make a Difference to Learners' Attitudes?* (Macaro & Lee, 2013) is organised by data type and then research question:

- Quantitative findings: RQ1, RQ2, RQ3
- Qualitative findings: RQ1, RQ2, RQ3

The Results section of *LED illumination and plant growth regulators' effects on growth and phenolic acids accumulation in Moluccella laevis L. in vitro cultures* (Zielińska et al., 2020) is organised by the three aspects of plant growth investigated:

- Shoot cultures
- Chlorophyll content
- Phytochemical analyses

Task 1: analyse a Results extract

Here's an extract from a research report investigating the time management skills of online and on-campus students. Which parts relate to:

- reference to table
- main findings
- detailed findings
- brief comments

Mean time-management ratings are shown in Table 1. A 2x3 ANOVA showed that online students' time-management ratings were significantly higher than on-campus students' ratings ($F(2,38)=4.32$, $p=0.023$), suggesting that online students have better overall time-management skills. There was also a significant effect of time-management subscale ($F(2,38)=2.31$, $p=0.009$). Post-hoc Bonferroni-corrected t-tests showed that ratings for the Propensity to Plan subscale were significantly lower than ratings for the other two subscales, suggesting this is a more difficult aspect of time-management. The interaction between the two variables was not significant, which suggests that online students have better overall time-management skills, rather than an advantage in a particular aspect of time-management.

Table 1. Time-management subskill ratings by online and on-campus students

Student group	**Meeting deadlines mean(SD)**	**Propensity to plan mean(SD)**	**Effective organisation mean(SD)**
Online	4.2(0.7)	3.5(0.9)	3.9(0.6)
On-campus	3.8(0.6)	3.1(0.4)	3.7(0.8)

Task 1 answer key.

Tables & Figures

Tables and figures can be used to display information and data clearly. They are used to present data in the Results section and sometimes also the Method section.

Titles

Every table/figure must have a numbered title that gives enough information so the data can be understood without reading the text. Titles usually appear above a table and below a figure - but check your department's formatting guidance. Write titles directly into your document.

Example titles:

- Table 1. Amino acid composition of red meat and poultry meat
- Table 2. Mean verbal reasoning scores by age group
- Figure 1. Employee satisfaction according to company location
- Figure 2. Growth rates of barley species in different soil compositions

In-text reference

Refer to each table and figure at the relevant point in your text and summarise the key point. One way to do this is:

1. Introduce a finding.
2. Direct the reader to the table/figure which illustrates this finding.
3. Highlight key details, referring to the table/figure where necessary.

See *Task 1: analyse a Results extract* for an example of this.

Tables

Tables are useful to summarise numerical, frequency or rating data across variables, categories, groups or conditions.

- Variable labels must make sense to the reader and include any units used.
- The content of tables is usually included in your word count.
- Build tables into your document directly - don't copy/paste from analysis software.
- Only include necessary information. Large tables with additional detail can be included in an appendix if needed.
- You may also use tables in your method section to present numerical information (e.g., demographic information about participants)

Table 1. Time-management subskill ratings by online and on-campus students

Student group	**Meeting deadlines mean(SD)**	**Propensity to plan mean(SD)**	**Effective organisation mean(SD)**
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Figures

Figures (including graphs) show data visually. They're useful to compare data and trends across variables, conditions, categories, groups or over time. You can also use diagrams to visualise procedures or equipment set-up.

- Use an appropriate type of figure to present your data.
- Axis or variable labels must make sense to the reader and include any units.
- Save the figure as an image and insert it into your document - never copy/paste directly from your analysis software.

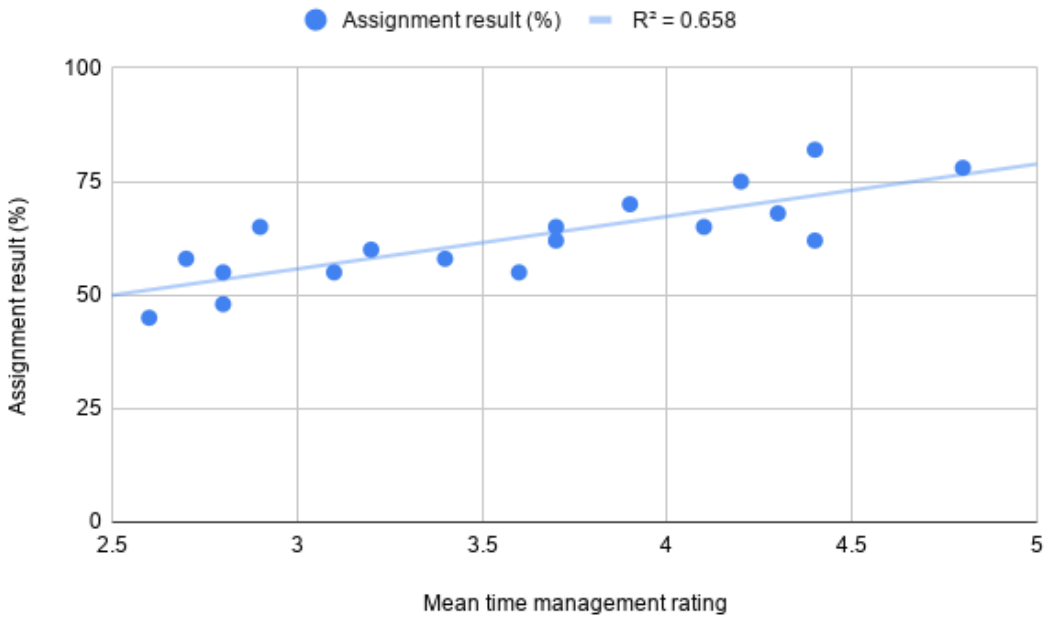

Figure 1. Relationship between self-rated time-management skills and assignment outcome.

Discussion section

The purpose of the Discussion section is to explain and interpret your results - **what do your results mean?** How do your findings fit into previous research? This section involves a lot of critical analysis. You're not just presenting your findings, but putting them together with findings from other research to build your argument about what the findings mean.

Structure

Discussions generally follow this broad structure:

1. At the very start, briefly restate the study aims - usually just one or two sentences.
2. Explain your findings. This is the most important aspect of the discussion!
3. Consider the limitations of your research.
4. Consider the implications of your research or make recommendations.

Explaining findings

The discussion is all about explaining your findings - what do your results mean? Explain overall/general findings before more detailed findings - this will probably be the same order as in the results section.

Follow these steps for each finding:

1. Report the finding
   - At the start of the explanation, briefly report the finding in sentence form.
   - Don't repeat the results section. The focus here is on the explanation, not the data analysis.

2. Relate your finding to previous research
   - Compare your results and explanations to previous studies to show how your study fits into the literature.
   - Include studies with similar and different findings, as applicable.
   - If a study's findings/explanations are different to yours, can you explain why?

- Most (if not all) of these studies will have already been cited in the introduction, but you can also cite new sources.

3. What does it mean?
   - Why did these results occur? What do your specific findings mean about the world more generally?
   - If there are multiple possible explanations, consider all of these, not just the one that fits best with your predictions.
   - Don't overinterpret your findings - make sure your explanations can be supported by your findings.

See *Task 2: analyse a Discussion explanation* for an example.

Limitations

Limitations are problems relating to study design, methodology or data collection that could influence your findings or limit their generalisability. Limitations can relate to:

- sample size
- choice/design of measure, test or tool
- difficulties accessing participant populations, documents etc.
- time or funding constraints on methodology choices
- other external factors

For example, you have problems recruiting participants, which means your sample size is small. This is a limitation because you have a small amount of data, which makes it difficult to draw conclusions from statistical analyses and means your findings are less generalisable to the population.

Always acknowledge limitations! You won't lose marks for discussing limitations and thinking critically about their implications, but you will probably lose marks if you ignore them.

Limitations are usually considered at the end of the discussion section. If a limitation relates closely to a specific aspect of your findings, you can also discuss it at this point.

For each limitation:

- describe the limitation and explain how it occurred.
- discuss the impact of the limitation on your findings.
- consider whether the limitation suggests further research is needed.

This extract from *A novel test of planning ability: Great apes can plan step-by-step but not in advance of action* (Tecwyn et al., 2013) discusses how the methodological differences needed to study the two ape species may have influenced the findings:

"Unfortunately it was not possible to draw direct comparisons between the performances of the two species due to unavoidable methodological differences, particularly those concerning whether the subjects were tested individually or in a group. Generally speaking, individuals that are able to concentrate and are not distracted will perform better in cognitive tasks (Herrmann and Call, 2012), and attention is known to be important in planning tasks (Parrila et al., 1996). While orangutans were tested individually (apart from those with dependent infants or juveniles), bonobos were tested in their social groups. This may have disrupted their attention, and prevented them from perceiving and encoding relevant task features. Conspecifics could have attempted to steal the rewards, which may have introduced a competitive element and encouraged impulsive behaviour, depending on which other individuals were present (Stevens and Stephens, 2002). There was also the potential for subjects in the same subgroup (Keke, Banya and Kichele) to learn to solve the tasks through observation, but we found no evidence for this."

Implications

At the end of the discussion, consider the implications of your findings - what do they mean for the future? Depending on your study, you might consider:

- Future research: does your study suggest any new questions to investigate?
- Practice: can your findings be applied in a practical way?
- Policy: does your study have implications for new policy, or can you recommend adaptations needed to existing policy?

In some subjects, this might form a separate Conclusion section - check your assignment guidelines.

This extract from *Social-Emotional Learning Program to Promote Prosocial and Academic Skills Among Middle School Students With Disabilities* (Espelage et al., 2016) considers the implications of the research findings for school policy and suggests areas of future research:

"Overall, students with disabilities tend to have lower social and communication skills than their peers without disabilities, which serve as two of the most notable predictors of victimizations for this population of students (Rose et al., 2011). Therefore, schools should begin to incorporate interventions that are designed to increase skill development. The current study demonstrates the promise of SEL programming for students with disabilities, especially for willingness to intervene in bullying situations and academic outcomes. While future research is needed to support these findings, this study serves as the foundation for increased longitudinal analyses for students with disabilities and social-emotional outcomes. Most importantly, this study demonstrates the importance for implementing targeted interventions for individuals with disabilities."

Task 2: analyse a Discussion explanation

This extract is from the start of the Discussion of *Breaking voice identity perception: Expressive voices are more confusable for listeners* (Lavan et al., 2019), which investigated how familiarity with speakers affects how people identify voices.

Identify the parts of the extract with these functions:

- Restate study aims
- Report findings
- Link to previous research
- What it means

"Using naturally varying clips from a popular TV show, we investigated how voice identity perception is affected by expressiveness in speech. For both high- and low-expressiveness speech, familiar listeners perceived fewer identities in a voice-sorting task than unfamiliar listeners: familiar listeners most frequently perceived [...] two identities for highly expressive speech, and three identities for low-expressiveness speech, while unfamiliar listeners most frequently perceived nine identities in the highly expressive speech compared with six identities for less expressive speech. This study replicates previous findings highlighting that unfamiliar identity perception is highly susceptible to the effects of within-person variability, while familiar voice/face processing remains relatively unaffected (Jenkins et al., 2011; Lavan, Burston, & Garrido, 2018). This advantage for familiar listeners was linked to being better able to 'tell together' different exemplars from the same voice. Unfamiliar listeners, on the other hand, frequently split the exemplars of a single voice identity into different clusters. In contrast, both listener groups performed equally well for 'telling people apart.' This pattern of results may indicate a bias in unfamiliar listeners, who in the absence of a person-specific representation of a voice are likely to assess any acoustic differences between exemplars as cues to dealing with separate identities, thus frequently perceiving within-person variability as between-person variability. In contrast, familiar listeners have access to a person-specific representation that is likely to include information on how this voice varies (see Burton, Kramer, Ritchie & Jenkins, 2016 for faces). By accessing a person-specific representation,

familiar listeners are thus able to largely overcome this perceptual bias, allowing them to "tell people together," leading to more accurate perception of identity."

Task 2 answer key

Other sections

Abstract

The abstract is a short summary of the whole report, given before the Introduction. It gives an overview of your research and helps readers decide if it's relevant to their needs.

- Not all reports need an abstract - check your assignment instructions to see if you need to include one.
- Even though it appears at the start of the document, write the abstract last. It summarises the whole report, so you need to finish the main body before you can summarise it in the abstract.
- Usually, the abstract follows a very similar structure to the report, with one or two sentences each to show the aims, methods, key results and conclusions drawn.
- Some subjects use headings within the abstract. Even if you don't use these in your final abstract, headings can help you to plan a clear structure.

The abstract of *The Effect of Weather on Crime in a Torrid Urban Zone* (Trujill & Howley, 2019) shows a 'mini report' structure:

"This study investigates the relationship between weather and crime in Barranquilla, Colombia, a city in the Torrid Zone, which in contrast to more commonly studied temperate zones is hot and humid year-round. Our analysis is based on daily variations in four weather variables (temperature, relative humidity, precipitation, and wind speed) and two indicators of criminal activity, namely, homicides and interpersonal violence. To help identify statistical links, we add controls for temporal variables. Using count data models in the estimations, we do not find any statistically significant relationship between weather patterns and homicides. However, we find that weather can be an important predictor of interpersonal violence in this area. These findings draw attention to the importance of considering weather factors when designing a long-run urban security policy in one of the world's most vulnerable regions to climate change."

Reference list

The reference list appears after the main body of the report. It gives details of the sources cited in the text so the reader can find them if they want to.

The reference list:

- includes all sources cited in the main text.
- doesn't include sources that aren't cited in the main text.
- must be formatted correctly according to your department's referencing style (see the Referencing Style Practical Guide).
- isn't included in the word count - but in-text citations are.

See *References* for an example of a reference list in APA style.

Appendices

Additional, non-essential information can be included in an Appendix after the Reference List. Appendices are not included in the word count. Appendices should only be used for extra information - all essential

information must be included in the main text. If you include any appendices, reference them in the text at the relevant point.

Information that might be included in the Appendices:

- example visual materials
- the complete questionnaire, test, stimuli etc.
- interview transcripts

Teacher Language Background, Codeswitching, and English-Only Instruction: Does Age Make a Difference to Learners' Attitudes? (Macaro & Lee, 2013) includes two Appendices:

- Appendix S1. The Participant Questionnaire.
- Appendix S2. Coding Scheme of the Interview Data.

Task 3: which section?

Which section is each extract most likely to come from?

1. Listening comprehension correlates with metacognitive strategies (r=-.782, p<.005), and vocabulary correlates with segmentation (r=.456, p<.005) (Figure 13).
2. The study recruited 19 neurotypical individuals (7 male) from the University of York with age ranging from 19 to 34 years (mean = 22.84). All participants had normal or corrected to normal visual acuity and self-reported normal colour vision.
3. Vocabulary accounted for 23% of listening comprehension variance, which is a lot lower than in previous research (Milton et al., 2010; Staehr, 2008). This discrepancy could stem from an overall lower proficiency level of participants in this sample.
4. During cytokinesis, the contractile ring exerts the essential force which divides the mother cell into two daughter cells (Miller, 2011).
5. Genomes of S. lugdunensis strains 166_A1 and 166_G1 were sourced through skin swabbing and wound washing, respectively. Following preparation as detailed in the GG3 2017 WetLab Manual, the genomes were sequenced in duplicate, using an Illumina Miseq machine at the Edinburgh Genomics centre.
6. The main effect of colour was non-significant, F(2, 12) = 0.59, p = .569, partial η2 = 0.09. There was a significant interaction effect between frequency and colour, F(4, 24) = 2.92, p = .042, partial η2 = 0.33.
7. Mirror neurons are a special class of neurons that respond during both self-execution of a goal-directed action as well as the perception of someone else performing the same action. They were originally discovered in area F5 of the primate cortex (Di Pellegrino et al., 1992; Rizzolatti et al., 1996).
8. The current study also did not take into consideration the participants' performance on the attentional task. It is hence possible that participants failed to pay attention throughout the experiment, which may affect their EEG responses (Kim et al., 2011).

Task 3 answer key

Where to next?

You can also view this guide as an interactive tutorial: Writing a research report [interactive tutorial]

- **Academic Writing Practical Guide:** Advice, guides and tutorials on all aspects of academic writing, including dedicated report writing advice.
- **Skills Guides:** Video, interactive tutorials, workbooks and links to develop a wide range of academic reading. writing and digital skills.
- **Reference Management: a Practical Guide**: Reference management applications allow you collect, organise, and cite material in your work, providing a useful way to keep track of your reading.
- **Reference Styles: a Practical Guide:** Referencing is a key aspect of academic writing. This practical guide contains advice and examples to help you use your department's referencing style correctly.
- **Writing Centre:** 1:1 writing advice and study coaching
- **Maths Skills Centre:** Advice on maths and statistics

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Task answer keys

Task 1 key: analyse a Results extract

Reference to table: Reference each table or figure at the relevant point in the text.

- Mean time-management ratings are shown in Table 1.

Main findings: Give the main, key or overall findings first. This study is mostly interested in the difference between the two groups of students, so this effect is given first, followed by the effect of the type of time management skill.

- A 2x3 ANOVA showed that online students' time-management ratings were significantly higher than on-campus students' ratings (F(2,38)=4.32, p=0.023),
- There was also a significant effect of time-management subscale (F(2,38)=2.31, p=0.009). Post-hoc Bonferroni-corrected t-tests showed that ratings for the Propensity to Plan subscale were significantly lower than ratings for the other two subscales,

Detailed findings: Give detailed findings after main findings. For example, interactions are given after the main effects of the variables.

- The interaction between the two variables was not significant,

Brief comments: Briefly comment on the implications of the findings, but don't explain them in detail - that goes in the discussion section.

- suggesting that online students have better overall time-management skills
- suggesting this is a more difficult aspect of time-management.
- which suggests that online students have better overall time-management skills, rather than an advantage in a particular aspect of time-management.

Complete extract:
Mean time-management ratings are shown in Table 1. A 2x3 ANOVA showed that online students' time-management ratings were significantly higher than on-campus students' ratings (F(2,38)=4.32, p=0.023), suggesting that online students have better overall time-management skills. There was also a significant effect of time-management subscale (F(2,38)=2.31, p=0.009). Post-hoc Bonferroni-corrected t-tests showed that ratings for the Propensity to Plan subscale were significantly lower than ratings for the other two subscales, suggesting this is a more difficult aspect of time-management. The interaction between the two variables was not significant, which suggests that online students have better overall time-management skills, rather than an advantage in a particular aspect of time-management.

Table 1. Time-management subskill ratings by online and on-campus students

Student group	**Meeting deadlines mean(SD)**	**Propensity to plan mean(SD)**	**Effective organisation mean(SD)**
Online	4.2(0.7)	3.5(0.9)	3.9(0.6)
On-campus	3.8(0.6)	3.1(0.4)	3.7(0.8)

Task 2 key: analyse a Discussion explanation

Restate study aims: a brief reminder of the aims. Only needed at the very beginning of the discussion.

- "Using naturally varying clips from a popular TV show, we investigated how voice identity perception is affected by expressiveness in speech."

Report findings: the extract first looks at the overall comparison of familiar and unfamiliar listeners, then presents more specific findings about how the groups differ.

- "For both high- and low-expressiveness speech, familiar listeners perceived fewer identities in a voice-sorting task than unfamiliar listeners: familiar listeners most frequently perceived […] two identities for highly expressive speech, and three identities for low-expressiveness speech, while unfamiliar listeners most frequently perceived nine identities in the highly expressive speech compared with six identities for less expressive speech."

- “This advantage for familiar listeners was linked to being better able to “tell together” different exemplars from the same voice. Unfamiliar listeners, on the other hand, frequently split the exemplars of a single voice identity into different clusters. In contrast, both listener groups performed equally well for 'telling people apart.'”

Link to previous research: The extract shows that the findings are similar to previous studies, and that the explanation for these voice recognition results is similar to explanations for face recognition.

- “This study replicates previous findings highlighting that unfamiliar identity perception is highly susceptible to the effects of within-person variability, while familiar voice/face processing remains relatively unaffected (Jenkins et al., 2011; Lavan, Burston, & Garrido, 2018).”
- “In contrast, familiar listeners have access to a person-specific representation that is likely to include information on how this voice varies (see Burton, Kramer, Ritchie & Jenkins, 2016 for faces).”

What it means: these critical comments suggest what these specific findings may mean in terms of how people recognise voices in general.

- “This pattern of results may indicate a bias in unfamiliar listeners, who in the absence of a person-specific representation of a voice are likely to assess any acoustic differences between exemplars as cues to dealing with separate identities, thus frequently perceiving within-person variability as between-person variability.”
- “By accessing a person-specific representation, familiar listeners are thus able to largely overcome this perceptual bias, allowing them to 'tell people together', leading to more accurate perception of identity.”

Complete extract:

“Using naturally varying clips from a popular TV show, we investigated how voice identity perception is affected by expressiveness in speech. For both high- and low-expressiveness speech, familiar listeners perceived fewer identities in a voice-sorting task than unfamiliar listeners: familiar listeners most frequently perceived [...] two identities for highly expressive speech, and three identities for low-expressiveness speech, while unfamiliar listeners most frequently perceived nine identities in the highly expressive speech compared with six identities for less expressive speech. This study replicates previous findings highlighting that unfamiliar identity perception is highly susceptible to the effects of within-person variability, while familiar voice/face processing remains relatively unaffected (Jenkins et al., 2011; Lavan, Burston, & Garrido, 2018). This advantage for familiar listeners was linked to being better able to ‘tell together’ different exemplars from the same voice. Unfamiliar listeners, on the other hand, frequently split the exemplars of a single voice identity into different clusters. In contrast, both listener groups performed equally well for ‘telling people apart.’ This pattern of results may indicate a bias in unfamiliar listeners, who in the absence of a person-specific representation of a voice are likely to assess any acoustic differences between exemplars as cues to dealing with separate identities, thus frequently perceiving within-person variability as between-person variability. In contrast, familiar listeners have access to a person-specific representation that is likely to include information on how this voice varies (see Burton, Kramer, Ritchie & Jenkins, 2016 for faces). By accessing a person-specific representation, familiar listeners are thus able to largely overcome this perceptual bias, allowing them to “tell people together,” leading to more accurate perception of identity.”

Task 3 key: Which section?

The most likely section for each extract:

1. Listening comprehension correlates with metacognitive strategies (r=-.782, p<.005), and vocabulary correlates with segmentation (r=.456, p<.005) (Figure 13). **Results**
2. The study recruited 19 neurotypical individuals (7 male) from the University of York with age ranging from 19 to 34 years (mean = 22.84). All participants had normal or corrected to normal visual acuity and self-reported normal colour vision. **Method**

3. Vocabulary accounted for 23% of listening comprehension variance, which is a lot lower than in previous research (Milton et al., 2010; Staehr, 2008). This discrepancy could stem from an overall lower proficiency level of participants in this sample. **Discussion**
4. During cytokinesis, the contractile ring exerts the essential force which divides the mother cell into two daughter cells (Miller, 2011). **Introduction**
5. Genomes of S. lugdunensis strains 166_A1 and 166_G1 were sourced through skin swabbing and wound washing, respectively. Following preparation as detailed in the GG3 2017 WetLab Manual, the genomes were sequenced in duplicate, using an Illumina Miseq machine at the Edinburgh Genomics centre. **Method**
6. The main effect of colour was non-significant, $F(2, 12) = 0.59$, $p = .569$, partial $\eta 2 = 0.09$. There was a significant interaction effect between frequency and colour, $F(4, 24) = 2.92$, $p = .042$, partial $\eta 2 = 0.33$. **Results**
7. Mirror neurons are a special class of neurons that respond during both self-execution of a goal-directed action as well as the perception of someone else performing the same action. They were originally discovered in area F5 of the primate cortex (Di Pellegrino et al., 1992; Rizzolatti et al., 1996). **Introduction**
8. The current study also did not take into consideration the participants' performance on the attentional task. It is hence possible that participants failed to pay attention throughout the experiment, which may affect their EEG responses (Kim et al., 2011). **Discussion**