

Writing Papers

Here are some suggestions for information to include and how to organize your paper.

- Number pages (should be about 5 pages long + references and figures)
- Have a minimum of 5 references (somewhere between 5 and 10 should be good)

Title Page

- Title
- Name
- Running head

Intro

- First paragraph:
 - **Introduce the topic** you will be addressing at a general level and start to get at your question.
 - e.g., “Studying and learning new information requires focused attention...there are many distractions in everyday life...therefore it is important to know how different stimuli/factors influences attention”.
- 2nd paragraph
 - **Review some relevant background research.** Avoid being too general!
 - For example, if you will be looking at how music influences attention, review only studies that look at music and attention. Don't just talk about any study related to attention.
 - Try to review prior work in a way that leads naturally to your specific question
 - E.g., at the end of the paragraph you could say something like: “...prior work has shown that music disrupts attention...however, we don't know which aspect of music has this effect. It could be that only music with a fast tempo has a disruptive effect because of blah blah...”
- 3rd paragraph
 - **State your research question and hypotheses**
 - E.g., “Therefore to address this gap in the literature...or because prior work has yielded conflicting findings...we decided to examine the effect of music tempo on attention...our study will compare performance on an

attention task while participants listen to 3 types of music...slow, medium, fast...

- "...We hypothesized that music with a fast tempo would disrupt attention the most because of blah blah.
 - Make sure that if you have a specific hypothesis, you use reasoning or past work to help you **explain why** you think that some variable X will influence some outcome Y in a specific way. ****This is crucial if you want to get full marks****
- You may also want to briefly explain the task you will use.
 - E.g., "To measure attention we used the flanker task, which involves blah blah..."
- **State your independent and dependent variables clearly.** E.g., Thus, music tempo was our independent variable and reaction time/accuracy/etc. on the flanker task was our dependant measure.

There should be a **logical progression**: overall topic → relevant background research and what we don't know about the topic → your study and specific question

Methods

- Participants
 - Include mean age of subjects + the standard deviation or range and number of males/females.
 - e.g., Participants were 20 students from UBC, mean age = 20.5 years (SD = 2.5 years or range = 18 – 25 years), with 10 being female.
- Procedure
 - Include as much detail as possible! Reading your methods I should be able to exactly replicate your study
 - E.g., Participants were **randomly assigned** to one of 3 music tempo conditions (slow, medium, fast).
 - ...they sat at a computer and listened to music through headphones while performing the flanker task...the music for each condition played for 1.5 minutes.
 - ...the music was this song...at these tempos...(be specific)
 - ...The flanker task requires participants to...blah blah...
 - How many trials
 - Explain how data will be analyzed (briefly)

- E.g., We collected reaction time from the flanker and for each participant, computed their average reaction time for each condition.
- RT for each condition was then analyzed with a one-way repeated measures analysis of variance (ANOVA), using an alpha level of $\alpha = .05$. (**Remember that alpha is different than your p-value**)

Results

- “We examined whether music tempo influenced RT during the flanker task – our measure of attention.
 - As displayed in figure 1, a repeated measures ANOVA revealed a significant effect of tempo condition on RT [$F(1, 18) = 4.56, p = .03$]. Follow-up t-tests showed that RT for the fast tempo condition (mean = 800 ms, SD = 250 ms) was significantly slower than RT for the slow tempo condition (mean = 500 ms, SD = 200 ms) [$t(19) = 3.88, p = .035$]. RT for the medium tempo condition (mean = 650 ms, SD = 230 ms) fell in between the other groups, and was not different from either (fast versus medium: $t(19) = 1.56, p = .11$; slow versus medium: $t(19) = 1.77, p = .15$).
 - Make sure you report exact p-values rounded to 2 or 3 decimal places
 - Make sure you get the language right → you are examining whether the independent variable (your conditions) leads to significantly different performance on your dependent variable.
- ****Remember: if you have 3 or more conditions, start with an ANOVA! Not t-tests. If the ANOVA is not significant, **STOP** there. If the ANOVA is significant, run t-tests comparing each pair of conditions/groups.
 - If the ANOVA was repeated measures, use paired-samples t-tests, if the ANOVA was between groups, run independent samples t-tests.
- Or: As displayed in figure 1, a repeated measures ANOVA revealed no effect of tempo condition on RT [$F(1, 18) = 1.56, p = .25$]. Then report means and SD for each condition.
 - If you get a non-significant effect:
 - Do not say things like: “*unfortunately*, the results did not support our hypothesis as the effect of tempo condition was non-significant... ”
 - **The data is what it is. Doesn’t matter if you find a significant effect or not.**
- If you get a p-value between .05 and .10, you can call that a **trend towards a significant effect**. In your discussion you can then essentially pretend like you got a significant effect.
- Figures
 - Remember, plot the means for each condition/group + error bars.

- Error bars are the standard error (SE). This is calculated as the standard deviation divided by the square root of the number of subjects
- $SE = \frac{SD}{\sqrt{N}}$

Discussion

- Often good to start with a brief re-cap of your findings.
- Briefly discuss what prior work has found and how your results add to this. i.e., why are your results important? What do they add to our knowledge about this topic?
- Again, it doesn't matter if your results showed a significant effect or not. Any results will be informative and can help to answer an experimental question.
 - So, you can say: “we found a significant effect of music tempo on flanker RT – our measure of attention – and this suggests that blah blah. Explain importance for how attention is influenced.
 - Or: ““our results did **not** find a significant effect of music tempo on flanker RT – our measure of attention – and this suggests that blah blah. Explain importance for how attention is influenced.
- ***Whether your findings were significant or not, explain the importance – what do the results tell us about attention or whatever! It is crucial that you don't just say what your findings were. An explanation for what your results mean is necessary for full marks!
- Also important: if you do not find a significant effect, don't just blame your experimental task as not being good enough to find an effect. Start off by assuming that you have a good task and that your results mean something.

Remember: We are not proving anything. We are just gathering data that will support a position – e.g., our data supports the idea that music tempo influences attention, or our data suggests that music tempo does not really influence attention. One study cannot prove that music tempo definitively has an effect or no effect on attention.

- Briefly discuss confounds or limitations.
 - Remember, a confound is a factor that was not controlled for and could explain your results
 - E.g., imagine we are looking at music tempo and 3 different songs were used. They might have differed not only in tempo, but maybe also in how much people liked the songs. Therefore, preference for a given song might have been influencing RT rather than tempo.
 - Remember, for a repeated measures design, a factor that varies across people is not a confound. E.g., If older people were slower than younger people on the flanker task, this is not a confound, because each person serves as their own baseline. You are comparing how each person's RT **changes** across conditions (their absolute RT is irrelevant).