Research Project Description:

Purpose of this project: You will look at statistical reporting in current research articles. Do they report statistics in a meaningful way? This course focuses on when and how to perform statistics, but also **practical significance versus statistical significance.** You will be listing out the effects that you find published and make a comment on what you think it means for researchers in your area.

**Absolutely do not copy from my notes, the book, Wikipedia, etc. for the research project. You can cite the articles you are using, but everything should be in your own words (no quotes!). You will get an F in the course if you copy in this way.**

Step 1. Find **FIVE** articles that cover a topic that you are interested in – they can be pretty different but should clearly be on the same topic.

* Must be published in a peer-reviewed journal (ask if you aren’t sure).
* Must include participants (aka it has a methods section that lists people/animals in some way). No theory papers.
* Look for statistics that you recognize: ANOVA, regression, *t*-tests, correlation, chi-square.

Step 2. Figure out what’s going on in the article.

* Put all the statistics in a table (see below). Each article may have several statistics, and therefore, each statistic should get one row. If a paper has multiple experiments, just list the first experiment numbers.
* An example is provided below.
* Things to look for:
  + correlation: *r*(df) = correlation, *p* = # p value (note that correlation is also an effect size, so it counts as both).
  + *t*-tests: *t*(df) = # t-statistic, *p* = *#* p value, *d or g or r*
  + *F*-tests: *F*(df, df) = # F-statistic, *p* = *#* p value, *R2 or w2 or n2*
    - These values work for ANOVA or regression, and may have a small *p* next to them for partial values.
  + Chi-square: *X2*(df) = # chi-square statistics, *p* = *#* p value, *V*

Hints for the table:

* Type of test is whatever they list in the article. If they say 2-way ANOVA, list it as a 2-way ANOVA. Note that you might find more numbers than you expect (i.e. in class, we talk about simple ANOVAs with one *F* value, but they can get more complicated with a lot more *Fs*).
* All the important numbers:
  + Each statistic reporting should include the following:
    - Some statistic (*F, X2, r, t*).
    - Some degrees of freedom *df*, usually listed in parenthesis next to the statistic. Note that *F* has two of them.
    - A *p* value.
* Statistically significant: is the *p* value reported less than *p* < .05?
* Effect size: do they include a relevant effect size? See above for a list of examples you might find.
* Size of effect: use the tables provided for size of effects:

|  |  |  |  |
| --- | --- | --- | --- |
| Effect | Small | Medium | Large |
| *d* | .20 | .50 | .80 |
| *r, V* | .10 | .30 | .50 |
| *R2, w2, n2* | .01 | .06 | .14 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Article | Type of Test | Statistic Reported | All the important parts? | Statistically significant? | Effect Size? | Size of Effect? |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

Example from article:

In Table 1 we present the mean cued recall performance in the four sessions of the ST condition. All means differed from each other as shown by a repeated-measures ANOVA, F(3, 117) = 353.65, gp 2 = .90, p < .001, and Sidak post hoc tests (ps < .001). To compare the two testing groups (STd and ST), we also calculated a cumulative recall score for each session. Cumulative recall refers to that the recall score increases across sessions on the basis of the first time an item was successfully recalled. A 2 · 4 mixed ANOVA with Group and Session as the independent variables showed no main effect of Group (F < 1), no Group ·Session interaction (F < 1), but a main effect of Session, F(3, 87) = 897.27, gp 2 = .92, p < .001. Sidak post hoc tests showed that all means differed reliably from each other (ps < .001; Table 1). In sum, there was a clear increase in learning across the sessions, the items were learned at the same rate in both groups, and the two groups leave the learning phase at identical learning levels. It is reasonable to assume that the SJOL group also learned at the same rate as the ST and STd groups.

Example table information:

(You can make the table landscape if you’d like).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Article | Type of Test | Statistic Reported | All the important parts? | Statistically significant? | Effect Size? | Size of Effect? |
| Jönsson, Hedner, & Olsson (2014) | Repeated measures ANOVA | F(3, 117) = 353.65, gp 2 = .90, p < .001 | Yes | Yes | Yes, np2 = .90 | Large |
| Jönsson, Hedner, & Olsson (2014) | 2X4 mixed ANOVA | Group (F < 1) | No, no *df* or F or *p* | No | No | N/A |
| Jönsson, Hedner, & Olsson (2014) | 2X4 mixed ANOVA | no Group ·Session interaction (F < 1) | No, no *df* or F or *p* | No | No | N/A |
| Jönsson, Hedner, & Olsson (2014) | 2X4 mixed ANOVA | Session, F(3, 87) = 897.27, gp 2 = .92, p < .001 | Yes | Yes | Yes, np2 = .92 | Large |

**What to turn in (the final paper):**

1. The whole thing should be (APA style):
   1. Double spaced.
   2. Times New Roman size 12
   3. One inch margins
2. Length – you do not have to write pages and pages. For each section, make sure you have the sections requested. I expect that methods and results will not be very long – so it’s ok if they are “short” but not one small paragraph please.
3. Writing style – you should write grammatically correct and formally (meaning scientific style that you see in journals – try to avoid colloquialisms). You can write things that you wouldn’t normally in the results section because we are summarizing other’s research, not running our own analyses of the experiments.
4. Title page – include the topic of your paper as a title, your name, and page numbers.
5. Introduction – describe the relevant topic. Use the papers you’ve pulled as sources. Look at their introductions – what do they explain to you? You can assume some basic knowledge of your field (i.e. terms you think everyone knows). You should make the introduction accessible to others (ask yourself – would my family know what this means? If not, describe it a little bit). I know those two sentences are slightly contradictory – try to strike a balance between the two. This section should be **2-3 pages double spaced**.
6. Methods
   1. Give an example of a typical experiment (if they are all different, describe one of them). What do people normally do in a study? You do not have to be super specific (i.e. detail one person’s study) but a general notion of the studies. For example, I might talk about how participants are normally asked to judge the relationship between word pairs on a 1-9 Likert scale for how strongly those words are related.
   2. Summarize the types of statistics used in the studies. Are they all using the same statistics? Do the majority use one type over another?
7. Results
   1. Insert your table of statistics.
   2. Comment on what you found:
      1. Reporting of statistics:
         1. In general, are people reporting statistics correctly?
         2. If not, what are they leaving out from their papers?
         3. Are things normally statistically significant?
         4. If so, what does that imply (think about the conversations about publish or perish)?
      2. Effect sizes:
         1. Do people report effect sizes?
         2. What is the average effect size?
         3. Do some studies appear to be better than others (higher effect sizes)?
         4. Practically is this effect real? Or the effect sizes seem small?
   3. What could the area you picked do better in reporting of statistics?
8. References
   1. List of articles you used in your study (APA style please 🡪 use knightcite if you don't know how).