Final Project Outline:

1. ~~RSA matrix:~~

~~Data – FACAT~~

~~Figure – matrix showing pairwise correlations of neural activity associated with each stimulus~~

~~Message – To show that certain brain regions (probably just hippocampus here) support abstract category representations~~

~~Audience – NIH study section~~

~~Other ideas – could contrast what a category representation matrix looks like with an item representation~~

1. ~~Category representations:~~

~~Data – FACAT~~

~~Figure – bar plot showing mean strength of category representations across different brain regions~~

~~Message – To show that certain brain regions support abstract category representations~~

~~Audience – NIH study section~~

~~Other ideas – may include item presentations to show the difference between different regions~~

1. ~~Category representations affect performance:~~

~~Data – FACAT~~

~~Figure – scatter plot between strength of category representations and categorization performance (or perceptual similarity measures).~~

~~Features – color highlighting could be used to compare with item representations~~

~~Message – To show that the strength of category representations in certain brain regions can track how well people make category judgements for new exemplars. Will need to contrast this effect with how well the strength of the item representations in the same brain regions track performance.~~

1. ~~Model fits in each region~~

~~Data – DICAT or PET~~

~~Figure – scatter plot showing the relationship between model fits of behavior and neural activity~~

~~Features – scale color by each strategy (prototype v. exemplar), could highlight just prototype~~

~~Message – Neural activity in certain brain regions track the type of strategy people use to make category judgements of new items.~~

1. Strategy by performance

Data – AEPET

Figure – bar plot comparing mean categorization performance based on the strategy used (exemplarist v. prototypeist), do not actually have this data though

Message – Participants relying on an abstract category representation will perform better than participants relying on unique category exemplars

Other Ideas:

FACAT:

* Could run a regression of each behavioral measure on the strength of item / category representations in the different brain regions
  + Plot the beta values with SE for the different confidence levels (I just loved the way it looked)
  + Could create pdf’s of the diff ROIs and annotate the plot with them?
  + Also could scale the color by the strength of the association! Use a continuous palette, possibly scaler palette by colorbrewer
* Correlating the strength of item and category representations in each ROI
  + Basically to show that exemplar v. prototype strategies were NOT correlated, participants used either one or the other (could annotate with line at 0)?
  + Not going to work bc they’re all too highly correlated
* Plotting the correlation matrix for the different FACAT behavioral measures, they actually form a pretty nice structure
  + They also show that it look like ppl were categorizing new faces using specific representations
  + Could also run with the rsa data

Theme I’m going to go for is incidental v. feedback-based category learning…

* In the incidental encoding paradigm, item representations were in AHIP and VMPFC
  + VMPFC item reps correlated with categorization accuracy
  + Categorization accuracy positively correlates with recognition
* In the feedback-based categorization paradigm, exemplar representations were found in PHIP while prototype representations were found in AHIP / VMPFC
  + No link to behavior yet
  + AEPET..
    - Categorization accuracy negatively correlates with exemplar model fits

Feedback:

**Plot 1: (item/category representations in FACAT)**

* Flip the coordinates so that the bars are horizontal and maybe making the y-axis even on both sides (i.e., ranging -0.03 to 0.03), also consider including a dotplot to be more clear about the distributions of the effect sizes.
* Add white lines around bars
* I think your message comes across, but as a reviewer I am left wondering why the item effect is not consistent in the post hip. Brain region. Could you annotate or subtitle your visualization to make the message more clear, or put another way, somehow communicate that this one inconsistency is trivial, if it is? In fact, to improve the communication of your message, why not put your message in the title.

**Plot 2: (correlation matrix with behavioral measures)**

* ~~Sticking with one color continuum for the p-value scale~~
* numbering the y-labs, then replacing the x-labs with their respective numbers according to the y-labs.
* Scaling the colors based on effect size of the correlations
* As I am outside of your field, I had a hard time understanding what you were wanting to communicate in this visualization so my feedback may be off the point. I do understand you wanted to show greater and lesser correlations. Since your figure seemed to have two goals, what about displaying those two goals in two iterations of the same visualization, only filter for the exact correlation (or correlations) you want to highlight, and only highlight those or pick brighter colors to highlight those. The way your correlation matrix is highlighted, my eye is most draw to the white box, the -0.09 correlation.

scale\_fill\_gradientn(colors = c("#088200", "#00823d", "#00836B", "white", "#CC7400", "#cc9900", "#ccb400"), values = scales::rescale(c(-.5, -.3, -.1, 0, .1, .3, .5)), name = "Pearson \nCorrelation") +

**Plot 3: (correlation b/w behavior and representations)**

* Version 1:
  + Geom\_jitter instead of geom\_point, also Daniel suggested ggforce::geom\_sina rather than geom\_jitter
  + Could add quadratic fits in addition to the linear fits
* Version 2:
  + If you think using density ridges are appropriate for the data or NIH report, then I would suggest using them instead of the error bars. That approach might better demonstrate the spread of your betas. Another thought is to consider ordering the y labs in a descending order from smallest to largest beta range.
  + Change dashed line to dotdash, size 1; change points to black
  + Could try using gghighlight
  + For visualization three, I prefer the second iteration. The coloring of the VMPFC helps draw my eye to what you are communicating. One suggestion would be to make the point of the beta bigger, to draw my eye to it even more. Again, I think you could add a subtitle to help clarify your message.

**Plot 4: (prototype/exemplar correlates with brain regions)**

* I like the idea of combining figure 1 and 2 side-by-side to compare the conditions. For this figure, can you specify which parameter you are estimating?

**Plot 5: (correlation between proto advantage and categorization accuracy)**

* Could include curvilinear fits

stat\_smooth(data = filter(facat\_sub, roi == "VMPFC" & rep\_type == "itemrep2"),

color = "gray70", method = "lm", se = FALSE,

formula = y ~ x + I(x^2)) +

**Additional notes:**

* Writing out the acronyms in the captions of the plots
* Jtools package for APA publication figures
* For combining plots, could use patchwork or cowplot packages