stuartwells@email.arizona.edu

From: Blais, Brian - (bblais) <bblais@arizona.edu>
Sent: Sunday, May 9, 2021 7:39 PM
To: Wells, Stuart Allen - (stuartwells)
Subject: Re: translocation authors survey responses
Attachments: Repro2x2.jpeg

Thanks for reminding me,

GLM or a 2 factor ANOVA (ANCOVA?) I think is what I mentioned? I'd first run some histogram and exploratory tests on each of your datasets (the hormones) and see if they're nonnormal or violate any assumptions. From that, you can best determine to use a general linear model (parametric) or a generalized linear model (nonparametric). *They often yield the same results and the latter is safer due to lack of assumptions. But if my data were normal and followed assumptions, I'd still use the former.

Here is my code for making subsets:

```
# to subset one level within one column
subsetname<- data_object[which(column_name == 'vertbatim_sublevel_name'),]

#to subset across multiple columns
attach(data_object)       #is run so no need to specify the dataset (i.e., object) name for the following command
subset_name <-c(column_name1 + column_name2 + ...)



#making pretty(ish) plots, then arranging them in a facet grid, then saving a (better) graphic than base R does
library(sjPlot)
library(sjmisc)
library(ggplot2)
theme_set(theme_sjplot())
library(gridExtra) #easiest for making facet grids #gartersnake copulation data (four separate graphics) as an example
  plot1<- plot_model(glm_final, type = "eff", terms = c("Jul.bin", "Age.bin" ),title="") #type = "" is a parameter of sjPlot package; "Jul.bin" ...etc are variable names (i.e., headers)
  plot2<- plot_model(breed.f.glm7, type = "pred", terms = c("Mass[all]", "Age.bin"),axis.title=c("Female Mass (g)", "Breed"))
  plot3<- plot_model(breed.m.glm3, type = "pred", terms = c("Mass[all]", "Jul.bin"),axis.title=c("Male Mass (g)", "Breed"))
```

```
  plot4<- plot_model(breed.f.glm7, type = "pred", terms = c("Mass[all]",
"Jul.bin"),axis.title=c("Female Mass (g)", "Breed")) #A 2x2 figure graphic to encompass everything
  grid.arrange(plot1,plot2,plot3,plot4,nrow=2)
  ggsave("2x2.png", dpi=600, height=144, width=180, units="mm") #adjust "file name", file type
[.png; .jpg; .tif], DPI, dimensions as needed {can change units to "in" or "cm"}  *FYI saves the
image to the working dir folder by default **resulting image attached to show you an example of
what this code produces. There are ways to add label letters A, B,... to the grid too but I didnt have
that here (I manually added them in Gimp)
```

Finally, if you think some of your data might be analyzed by an ANCOVA, this site is great for explaining situations requiring ANCOVA and how to run them in R. I went through several worthless Ancova help pages before I found, and used, this format.
https://www.datanovia.com/en/lessons/ancova-in-r/
[https://www.datanovia.com/en/wp-content/uploads/2019/05/X26814448_567195243620424_5875663421650887010_n.jpg]<https://www.datanovia.com/en/lessons/ancova-in-r/>
ANCOVA in R: The Ultimate Practical Guide - Datanovia<https://www.datanovia.com/en/lessons/ancova-in-r/>
The Analysis of Covariance (ANCOVA) is used to compare means of an outcome variable between two or more groups taking into account (or to correct for) variability of other variables, called covariates.In other words, ANCOVA allows to compare the adjusted means of two or more independent groups. For example, you might want to compare "test score" by "level of education" taking into ...
www.datanovia.com

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From: stuart allen wells <stuartwells@email.arizona.edu>
Sent: Sunday, May 9, 2021 7:04 PM
To: Blais, Brian - (bblais) <bblais@arizona.edu>
Subject: Re: translocation authors survey responses

Thanks Brian
Hey what was the analysis besides glm that you mentioned

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From: Blais, Brian - (bblais) <bblais@arizona.edu>
Sent: Sunday, May 9, 2021 4:12:08 PM
To: Wells, Stuart Allen - (stuartwells) <stuartwells@email.arizona.edu>
Subject: translocation authors survey responses

Hi Stu,

I cannot recall if I shared this with you previously, but skim down to the "Online Survey" subsection within Methods of this paper as it may have some helpful tips on surveying perspectives from authors involved in translocation efforts.

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