Presentations

Presenting author(s) are indicated with an asterisk (*).

2020

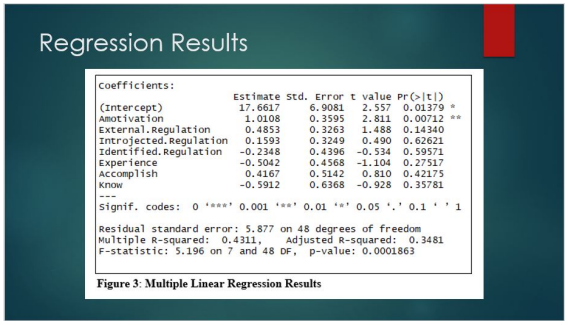
B. Gochanour*, S. Chen., L. Beebe. and D. Haziza. 2020. A Nonparametric Multiply Robust Multiple Imputation Method for Causal Inference. Joint Statistical Meetings (Contributed Poster Session). Virtual Conference.

A. Contina*, **B. Gochanour**, J.L. Alcantara, and M.B. Wunder. 2020. Stable Isotopes in Conservation Biology: Case Studies in Migratory Birds. The North American Congress for Conservation Biology (NACCB), Denver, Colorado.

B. Gochanour*, S. Chen., L. Beebe. and D. Haziza. 2020. A Nonparametric Multiply Robust Multiple Imputation Method for Causal Inference. Scheduled for poster presentation at the 2020 Graduate Research Education and Technology (GREAT) symposium, canceled due to COVID-19 pandemic.

2019

B. Gochanour*. 2019. Investigating Math Motivation and Math Anxiety in Undergraduate Students. University of Oklahoma, Research in Undergraduate Math Education Seminar. Norman, Oklahoma. Download Slides or Download Full Honors Thesis



2018

B. Gochanour*, L. Wiseman, A.M. Nguyen, P. Cimprich, M. Pandit, A. Contina, J.F. Kelly. 2018. The Effect of Handling Time on Boldness in Dark-eyed Juncos. First Year Research Experience Presentation Session. Norman, Oklahoma. Download Poster PDF

The Effect of Handling Time on Boldness in Dark-eyed Juncos

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Motivation and Hypothesis

- The Dark-eyed Junco (*Junco hyemalis*) is a common sparrow found across the U.S. and Canada.
- Several researchers have studied junco migration (for example, see Bridge et al., 2010). In most cases this requires catching birds with mist nets or traps and handling the bird as external markers or tracking devices are added.
- Researchers assume that handling birds causes them stress, however the effect of this stress on their behavior has been less well documented.
- **I hypothesize that an inverse relationship will exist between the length of time a junco is handled and future junco boldness.**

Methods

Part I: Banding

- 36 Dark-eyed Juncos (hereafter referred to as "juncos") were caught using potter traps and mist nets at the Aquatic Research Facility (ARF) on the University of Oklahoma Research Campus.
- Each junco was banded with a Radio Frequency Identification (RFID) band, U.S. Geological Survey Aluminum band, and color bands.
- Age and sex were estimated in the field, and blood was drawn for genetic sexing.
- The bird was then released.
- Juncos were banded on nine dates between 2/3 and 2/16. For birds banded or recaptured on 2/11, 2/12, and 2/13 researchers recorded handling time.

Figure 1: Junco being held

Part II: Observational Trials

- 68 thirty-minute trials took place at the ARF.
- Potter trap was placed in the same location as before, but now with the doors tied open.
- Observer used a spotting scope and a voice recorder to record observations of juncos within 5 meters of the trap (Figure 2).

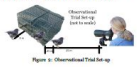

Figure 2: Observational Trial Set-up

Results

- As anticipated, there is a negative linear relationship between handling time and reappearance rate among juncos.
- **However, the relationship is weak and not statistically significant** (p-value=.263 and R-squared=.036).
- Although 36 juncos were originally banded, this graph only has 10 data points because numerous juncos were never re-sighted, and others didn't have handling times recorded.

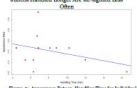

Figure 3: Appearance Rate vs. Handling Time for Individual Juncos

- As anticipated, there is a positive linear relationship between handling time and minimum distance (because a larger distance indicates less boldness).
- **However, the relationship is also not significant** (p-value=.333 and R-squared=.034).

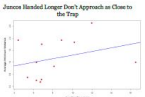

Figure 4: Average Minimum Distance vs Handling Time for Individual Juncos

Discussion

- **Our results provide only weak, non-significant, support for the hypothesis that handling time is inversely related with future boldness in dark-eyed juncos.**
- For better results, a follow-up study could randomly assign juncos to two groups: a long handling time group and a control group. This would be a more rigorous experiment and the results would allow for conclusions to be made about causation.
- Results could be further improved if the effective sample size were increased. Although 36 juncos were banded, many couldn't be re-sighted because the color bands or the identifying color tape on the RFID tags fell off (for example, see Figure 5). Adding more observational trials could also help increase our sample size.
- The RFID set-up (Figure 6) was intended to give an automatic data collection. However it wasn't able to withstand field conditions, and thus RFID tags were used only for visual observations. An improved RFID set-up would give us access to much more data.
- When analyzing the data, we discovered a statistically significant relationship between the mean latency times for males and females. A 95% confidence interval reveals that we expect the average male to arrive between 0.140 and 8.131 minutes later than the average female. This was a post-hoc observation, but a future study could explore this pattern further.

Figure 5: Junco with an RFID tag with an colored tape

Figure 6: Initial RFID Set-up (removed because of durability issues)

References

Bridge, E. S., Kelly, J. F., Bjornen, P. E., Curry, C. M., Crawford, P. H., & Paritte, J. M. (2010). Effects of nutritional condition on spring migration: do migrants use resource availability to keep pace with a changing world?. Journal of Experimental Biology, 213(14), 2424-2429.

R Core Team (2017). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.