Using Laerd Statistics as a Data Analysis, Interpretation, and Reporting Tool in Agricultural Education Research

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Introduction

Field (2018) expressed that competence in correctly interpreting data is fundamental to producing high-quality quantitative research. However, researchers sometimes fall victim to misusing statistics in their academic endeavors (Gardenier & Resnik, 2002; Marino, 2014). As outlined by Gardenier and Resnik (2002), statistics misuse can come about through various means, including: (1) limited competence with the subject, (2) unintentional errors that may result due to limited competence, (3) negligence when using statistics, and (4) deliberate research misconduct. Interestingly, researchers' misuse of statistics has a long and substantial history, as Cohen (1938) wrote about the topic over 80 years ago. More recently, Marino (2014) highlighted that researchers' motivations to achieve statistical significance "has hampered research via the publication of incorrect analysis driven by rudimentary statistical training" (p. 78), which thus compromises the integrity and value of scholarly research.

Such issues are not lost on the discipline of agricultural education. Johnson and Shoulders (2019) recently indicated that some traditional practices (e.g., using incorrect statistical analysis procedures, etc.) passed along from one generation of agricultural education researchers to the next may negatively impact the overall rigor and quality of agricultural education scholarship. As an example of this, Johnson and Shoulders (2019) noted that "[a]gricultural education researchers often seem addicted to inferential statistics and their associated *p* values! So much so that we often force the square pegs of our data into the round holes of inferential statistics" (p. 300). Johnson and Shoulders (2019) further explained that vague descriptions of research methods written by researchers (perhaps due to some limited understanding of the appropriate methods) can inadvertently undermine the value of agricultural education scholarship.

As a discipline, we should continue to hone the quality of our scholarship by adhering to best scholarly practices. Doing so will help to ensure both current and future researchers make appropriate decisions that ultimately impact the quality of scholarship produced (Johnson & Shoulders, 2019). Considering the preceding literature, perhaps Laerd Statistics could be a valuable resource for helping to positively impact both agricultural education researchers and their scholarship.

How it Works

As a continuously-updated platform that is intended for researchers of all experience levels, Laerd Statistics is a subscription-based statistics education resource (Lund Research Ltd, 2023a). The subscriptions vary in duration and price yet provide the same level of content access. Further, Laerd Statistics is geared toward IBM® SPSS® Statistics software and provides expansive details for a wide range of both parametric and non-parametric statistical tests, such as a Mann-Whitney U test, a one-way analysis of variance (ANOVA), and an ordinal regression. The details for each statistical test include: (1) correctly setting up the data, (2) meeting statistical test assumptions, (3) procedures for running the statistical test, and (4) details for properly writing-up the results in a manuscript. The website makes use of screenshots to help users

navigate the processes. The website also includes a "Statistical Test Selector" that details step-by-step instructions to ensure researchers are using the appropriate data analysis procedures (Lund Research Ltd, 2023b).

Regarding our own initial experiences with Laerd Statistics, the lead author of this abstract was informed about this resource by a member of his doctoral program committee. He subsequently used Laerd Statistics extensively while completing his dissertation research in 2019. Afterward, he continued using Laerd Statistics during subsequent research projects that he led. During one such project, he collaborated with the second author of this abstract and shared information about Laerd Statistics with him. In turn, he likewise began using it when planning, conducting, and documenting his own research projects. To date, we have both used Laerd Statistics to help us successfully conduct several state- and national-level research projects.

Implications

Our experiences using Laerd Statistics have led us to conclude that this resource can be particularly valuable for both graduate students and early-career researchers who are still working to build their statistics knowledge and skill sets. We would even suggest that this resource would be valuable for mid- and late-career researchers as well, particularly when attempting to use new and unfamiliar statistics. We found that this resource has, on numerous occasions, provided us with practical advice regarding analyzing and interpreting our data and reporting our results. When considering Johnson and Shoulders' (2019) advice regarding improving the quality of scholarship produced within our profession, we believe that Laerd Statistics could very well be an innovative and impactful tool for helping to heed their advice.

Future Plans and Advice to Others

We plan to continue using Laerd Statistics in our scholarly endeavors for the foreseeable future. While both of us currently work with very few research-oriented graduate students, we do plan to advise our current and future graduate students who are completing their thesis projects to use Laerd Statistics. Further, as the lead author will soon advise his first doctoral students, he plans to have them use the resource extensively. Based on our experiences, we do advise that other agricultural education researchers consider using Laerd Statistics not only when conducting their own studies but when working with graduate students' projects as well. We acknowledge that an online resource should not be a substitute for formal graduate-level coursework in either research methods or statistics. However, we likewise believe that introducing yet another tool into researcher's toolboxes could help to overcome some of the agricultural education scholarship issues that have been documented in our profession (Johnson & Shoulders, 2019).

Costs

A single-user license subscription ranges in price from $5.99 for one month's access to $40.99 for three years' access. Each plan type provides the same level of access to the website's resources (Lund Research Ltd, 2023c). Moreover, we found that faculty members can have free access to Laerd Statistics in perpetuity simply by contacting the company directly via e-mail and requesting such.

References

Cohen, J. B. (1938). The misuse of statistics. *Journal of the American Statistical Association, 33*(204), 657-674. https://www.tandfonline.com/doi/epdf/10.1080/01621459.1938.10502344?needAccess=true

Field, A. (2013). *Discovering statistics using IBM SPSS Statistics: And sex and drugs and rock 'n' roll*. Sage.

Gardenier, J., & Resnik, D. (2002). The misuse of statistics: Concepts, tools, and a research agenda. *Accountability in Research: Ethics, Integrity and Policy, 9*(2), 65-74. https://doi.org/10.1080/08989620212968

Johnson, D. M., & Shoulders, C. W. (2019). Beyond magic words and symbols: Rethinking common practices in quantitative research. *Journal of Agricultural Education, 60*(3), 291-303. https://doi.org/10.5032/jae.2019.03291

Lund Research Ltd. (2023a). *About us*. https://statistics.laerd.com/aboutus.php

Lund Research Ltd. (2023b). *Features overview*. https://statistics.laerd.com/features-overview.php

Lund Research Ltd. (2023c). *Plans & pricing*. https://statistics.laerd.com/pricing.php

Marino, M. J. (2014). The use and misuse of statistical methodologies in pharmacology research. *Biochemical Pharmacology, 87*(1), 78-92. https://doi.org/10.1016/j.bcp.2013.05.017