

## Introduction to the Special Issue on Open Science Practices: Badges of Honor

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**ABSTRACT.** *Psi Chi Journal of Psychological Research* recently began awarding Open Science Badges to studies meeting criteria for Open Materials, Open Data, Preregistration, and Replication. To inaugurate this initiative, this special issue gathers eight articles that reflect a wide diversity of topics but have each earned one or more badges. Reflections about the challenges and value of each of these practices are provided.

As a faculty member, I am sometimes frustrated when textbook publishers release a new edition of a textbook just two or three years after the previous edition, thereby making it harder for my students to have access to more reasonable used editions. Every new edition dutifully reports the large number of new references added since the previous edition, but in many cases the content itself has not changed sufficiently to warrant a new edition. Admittedly, for some courses, the knowledge base is growing at such a rapid pace that frequent revision is needed. For other courses, changes occur but those changes are not dramatic enough to warrant a two-year or three-year cycle. I used to point to Research Methods courses as an example; certainly, best practices in research methodology change, but it seemed unlikely that this would be a topic that would experience a sudden quantum shift. I was wrong.

As I wrote previously (Rouse, 2017), we appear to be at a turning point in which the standard practices of psychological research are being scrutinized, both by people inside our science and by external critics. Although the catalyst for this scrutiny was a very public case of fraud (a history that is described in more depth by Rouse, 2017), the effect showed that common practices in psychological research had, frankly, shifted away from many of the best practices that are often taught in Research Methods courses. For example, students in Research Methods courses are often taught about the importance of replication; even

if a study yields a  $p$  value low enough to make it unlikely that the results were due to chance factors, such Type I errors are still possible, and confidence in the finding can be bolstered if replicated. Nevertheless, few journals were willing to publish replications because of a perception that replication studies only make a minor impact on the science. As another example, students in Research Methods courses are often taught about the importance of carefully planning one's data collection and data analysis methodology prior to the onset of the study. Nevertheless, many researchers deviated from their initial plans if their results did not get below a  $p$  value of .05, making post-hoc changes such as increasing the sample size, revising the data analysis, or excluding outlier participants to nudge the  $p$  value to an acceptable level. These post-hoc changes (many of which would have been completely defensible if planned from the onset of the study) had the effect of increasing the likelihood of Type I errors and thereby decreasing the likelihood that the finding was replicable.

To encourage new standards of best research practices, the Center for Open Science developed badges that could be awarded to journal articles that followed specific criteria of transparency, openness, and replicability—badges for Open Materials, Open Data, and Preregistration (described in Rouse, 2017). Journals were invited to begin awarding these badges within their own pages. By accepting this invitation in 2016, *Psi Chi Journal of Psychological Research* was among the

first peer-reviewed empirical research journals in psychology to honor authors who followed these best practices. But the journal was even more trailblazing; to the best of our knowledge, this was the first empirical research journal in psychology to introduce a fourth badge, recognizing the importance of Replication studies. When the decision was made to begin awarding Open Science Badges, Jon Grahe (who was president of Psi Chi at that time) recommended a novel idea to help launch this initiative: publishing a Special Issue to highlight these new badges. Whereas most journals publish special issues that focus on a specific topical content, we wanted a special issue that would represent the full breadth of psychological research; the unifying factor would not be a specific topic but rather a commitment to earn one or more Open Science Badges.

It has been my honor to work with eight teams of researchers in the development of this issue. As hoped, the articles included in this special issue are as varied as the field of psychology itself. These researchers studied topics related to the attentiveness of research participants to consent form information (Baker & Chartier, 2018); the effect that being told someone is on the autism spectrum has on social attitudes toward that individual (Bolton & Ault, 2018); the impact of insecure attachment on memories of positive but stressful life events (Camden & Hughes, 2018); the interplay between work, school, and family satisfaction in predicting social integration and negative affect (Denning, Brannan, Murphy, Losco, & Payne, 2018); the effect of violent video for college students who are or are not student athletes (Gross & Albee, 2018); a collaborative, replication meta-analysis to explore previously published findings on the relationship between self-esteem and self-disclosure on Facebook (Leighton, Legate, LePine, Anderson, & Grahe, 2018); the degree to which thinking of oneself as “disabled” enhances a sense of belonging among disabled young adults (Raver, Murchake, & Chalk, 2018); and the protective effect of self-compassion when receiving undesirable feedback about one’s interpersonal or academic abilities (Saeed & Sonnentag, 2018). The wide diversity of topics (many well beyond the bounds of my own areas of expertise) required me to rely heavily on a team of exceptional masked reviewers, but the editorial board was committed to the belief that this special issue should reflect the breadth of our field.

## Insights Gained

### Open Materials

The experience of working with this special issue helped me gain insights about each of the four badges. First, the Open Materials badge was earned by all eight articles. To earn this badge, all of the research materials (with the exception of copyright-protected materials) must be stored in an open-access free repository in the Open Science Framework (OSF); if a researcher used copyright protected materials, those materials would need to be legally purchasable by qualified researchers wishing to conduct a replication. In each case, the Author Note at the end of the article provides the Internet address at which an interested reader can freely access all of the nonproprietary materials that would be needed to perform an exact replication. Upon reflection, it’s not surprising that this badge was the most common because it represents steps that do not require advanced planning; a researcher can decide to make original research materials publicly available at any stage of the research process. Having worked with these research teams on this issue, I have come to the opinion that the vast majority of all future articles could easily earn this badge.

### Open Data

Second, all but one of the articles earned the Open Data badge. To earn this badge, the research data itself must be publicly stored in an OSF website, allowing other researchers to download and reanalyze the data reported in the manuscript. For each of the articles earning this badge, you will find the web address for the OSF website in the Author Note at the end of the article. Obviously, all identifying information for the participants must be stripped from the dataset, but all of the data necessary to perform the analyses must be available. Although almost all of the articles met this requirement, I see two challenges that researchers will face if they seek this badge. The first challenge is a personal one; at the risk of sounding melodramatic, making one’s data publicly available is an act of bravery. After innumerable hours invested in a research project, it is not surprising that people might feel protective of their data, only making it available to other researchers who clearly explain their intentions in using it. Although one does not relinquish ownership of data by making it publicly available—another researcher would hopefully receive a strong rebuke from a journal if they attempted to use another

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person's data for their own research without gaining explicit permission—it might be difficult to prioritize the value of scientific transparency over the desire to protect the security of their own hard work. The second challenge is an institutional one; researchers who wish to earn this badge must either notify their Institutional Review Board (IRB) that data would be publicly available before collecting the data or seek IRB approval after data collection. Personally, I have begun including the following explanatory statement in consent forms before submitting my protocols for IRB review: “No information identifying me will ever be published in connection with this study. As part of the Open Science movement, the data collected from this project will be publicly archived in perpetuity at <https://osf.io> but any identifiable data will be eliminated from the data set prior to uploading; therefore, there will be no identifiable information in the archived data set.”

### Preregistration

Only two articles (Baker & Chartier, 2018; Leighton et al., 2018) earned the Preregistration badge. To earn this badge, the authors are required to complete a form prior to data collection or data analysis specifying all relevant plans for the study; this online form is then “frozen” in an unmodifiable form. For these two articles, the Author Note provides the website address for the preregistered plans. It is not surprising that this badge was earned infrequently; eligibility for this badge requires a research team to actively complete an additional step early in the research process. However, adding this extra step to the preparation phase of a research project would not be demanding; after all, the information provided in a preregistration is similar to the information provided for an IRB review. Consider, for example, the eight questions a researcher must answer when completing the “As Predicted” form on OSF (which can be seen for the Baker & Chartier (2018) study at <https://aspredicted.org/xyce3.pdf>). The researcher must (a) provide the main hypothesis for the study, (b) describe the dependent variables, (c) explain different experimental conditions to which participants will be assigned, (d) list the statistical analyses that will be conducted, (e) describe whether any secondary analyses are planned, (f) specify the target sample size, (g) preregister any other relevant aspects of the study (such as exclusionary/inclusionary factors), and (h) indicate whether or not the data have already

been collected. Any researcher who has already received IRB approval could easily answer these eight questions; it only requires taking an extra step between the IRB proposal and the onset of the study. Therefore, although few articles in this special issue received the Preregistration badge, I predict that these badges will become more common as researchers begin to see how easily this practice can be integrated into the research process.

### Replication

Only one article (Leighton et al., 2018) earned the Replication badge. To earn this badge, a study must be an exact replication of a previously published study or must systematically adjust one or more variables to explore the generalizability of the findings. The Author Note at the end of the Leighton et al. (2018) study clearly specifies the original study being replicated. Although there is a growing reassertion of the value of replication studies in scientific research, replication studies were viewed as being less important than original studies for several years, and it may take some time for researchers to begin seeing the importance of this type of research. To that end, the Leighton et al. (2018) article can serve as an exemplar of a replication study that effectively explores the nuances of the generalizability of previously published findings.

### Conclusion

Times are changing, and the field of psychology is adjusting to new practices of openness and transparency in the research process. This will make the field stronger, bolstering our confidence in the strength and generalizability of the research findings. However, as this special issue demonstrates, these new standards can easily be incorporated into the research process. Therefore, I want to express appreciation to these eight research teams for serving as models of these Open Science Practices.

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