Publishing Precision Teaching Research: Guidance from Experts in the Profession¹

For over a quarter-century (1980-2012), precision teaching (PT) and those using the Standard Celeration Chart (SCC) as a measurement tool primarily published their research in the *Journal of Precision Teaching and Celeration* (JPTC). After the final issue of JPTC in 2012, there was no longer an obvious publication outlet for research that either: (a) is in the area of PT or (b) includes the SCC. Some researchers have successfully published this type of work in other journals. However, they often make revisions to data display and language as an accommodation for the journals audience, which may have readership from broader application areas in behavior analysis, education, or psychology. One example of this may be requiring additional context and explanation of any terms that are PT specific (e.g., application check). Given the lack of dedicated publication outlets and continued need for peer-reviewed literature to support evidence-based practice of PT and SCC work, we have gathered publication advice from relevant experts.

The Science and Academic Affairs Committee for the *Standard Celeration Society* (SCS) interviewed six authors who have published PT or SCC work outside of JPTC. Interviewees included Kent Johnson, Rick Kubina, Chuck Merbitz, Kendra Newsome, Donny Newsome and Claire St. Peter. Each interviewee was asked questions organized into three general categories: (i) their advice for manuscript submission and preparation (e.g., potential journal outlets, experimental designs, results), (ii) advice for displaying data (e.g., recommended software, format), (iii)

¹ The *Standard Celeration Society* is grateful to Kent Johnson, Rick Kubina, Chuck Merbitz, Kendra Newsome, Donny Newsome, and Claire St. Peter for sharing their experiences and providing this invaluable guidance during their interviews.
general advice (e.g., research lines that need empirical support in the literature).

Responses were combined into relevant topic areas and are presented below. We hope that this manuscript will serve as a resource to others in their own publication endeavors. This document which will be modified as we receive additional recommendations or advice from others2.

Advice: Manuscript Submission and Preparation

Can you provide a list of some journal outlets that should be considered when publishing PT or standard celeration research?

1. The European Journal of Behavior Analysis
   http://www.ejoba.org/
2. Exceptionality: A Special Education Journal
   http://www.tandfonline.com/loi/hexc20
3. Behavioral Development Bulletin
   http://www.apa.org/pubs/journals/bdb/
4. Journal of Learning Disabilities
   http://ldx.sagepub.com/
5. Developmental Disabilities Bulletin (this is not a peer-reviewed journal but still a nice outlet for research)
   https://www.learttechlib.org/?fuseaction=Reader.ViewIssues&source_code=ISSN-1184-0412
6. Educational Psychology in Practice
   http://www.tandfonline.com/loi/cepp20
7. Behavioral Interventions
8. Education and Treatment of Children
   http://www.educationandtreatmentofchildren.net/
9. Journal of Behavioral Education
   http://link.springer.com/journal/10864
10. Journal of Instructional Psychology
11. Journal of Special Education
    http://sed.sagepub.com/
12. Performance Improvement Quarterly
13. Performance Improvement
    http://www.tandfonline.com/loi/worg20

2 Please contact us at science@celeration.org if you have any additional publication advice.
How do you select a journal to pursue publication?

Journal policies vary and have changed much in the last 20 to 30 years, but it is important to always look at a few issues to make sure that the article is aligned with what the journal publishes. The process is more complicated than whether or not a journal will accept the SCC, and it is a mistake to hypothesize that "SCC friendly" journals exist. The standard response of mainstream behavior analysis journals to chart-based submissions is that they do not provide enough experimental control techniques. We need to have data and experimental evidence worthy of sharing with the greater scientific community; these are nearly always lacking in chart-based research.

We should look beyond behavior analytic and educational journals when pursuing publications using the SCC. Beyond the use of behavioural fluency, the SCC has numerous applications which should be publishable in OBM journals, in macroeconomics, in therapy journals (e.g., counting feelings) and so on. Here you can see an example of the use of the SCC to count feelings: Calkin, A. B., & Pennypacker, H. S. (2003). A minute a day makes good feelings grow. European Journal of Behavior Analysis, 4(1-2), 5-11. Use the SCC to chart data outside of Precision Teaching per se. For example, chart data relevant to societal issues that lots of people with significant roles in the community are paying attention to (e.g., infant mortality rates, teen pregnancy, and homicide) and disseminate the use of the SCC to
interpret such issues by publishing in journals and publication outlets relevant to each specific issue.

*What are some tips for submitting a manuscript for publication?*

- No matter what journal, it all comes down to the reviewers who review the paper.
- Authors also should not be afraid to ask for the manuscript to be handled or reviewed by someone with expertise in PT.
- It is particularly useful for the authors to identify an appropriate reviewer—but keep in mind that this will go over best if the person identified is on the editorial board of the journal or has at least published in the journal previously.
- Avoid requesting someone that may have a conflict of interest (from the same organization as the authors, a lab mate or advisor of the authors, etc.).

*What types of experimental designs are most conducive to those working in clinical settings?*

Studies that are *n=1* are probably the least helpful, as are case studies within the context of publishing research that will contribute to an evidence-base for PT. That is not to say that case studies are not without merit and one might be able to start to get some additional exposure by publishing case studies in outlets like *Behavior Analysis in Practice* or *Behavior Analysis Research and Practice*. Such published case studies not only contribute to the dissemination of PT, the Standard Celeration Chart, and our unique and effective work, but create opportunities for researchers to build upon the methodologies used, adapt and replicate them with the use of experimental designs, and publish further.
Multiple baseline designs, within or across participants, are particularly workable in clinical settings where reversal designs might be contrary to your clinical goals and present difficulties due to the fact that many skills we aim to improve cannot be reversed once they have been learned to a fluent level. The goal of so many PT studies is to demonstrate that fluent skills have not only been achieved to a fluent level, but that when we stop instruction, they are retained. Therefore, reversal studies do not represent an experimental design best suited to our research and practice.

Natural experiments also come about often in the chaos of clinical practice, you just have to be vigilant for those opportunities. Changing criterion designs may fit in very nicely in clinical settings, especially where fluency aims are incrementally increased so that students meet gradually increasing aims before meeting their terminal aim. Byiers, Reichle, and Symons (2012) present an overview of SSRD for evidence-based practice (Byiers, B. J., Reichle, J., & Symons, F. J. (2012). Single-subject experimental design for evidence-based practice. *American Journal of Speech-Language Pathology, 21*(4), 397-414.)

When publishing research in the area of PT and behavioral fluency, should the language in the manuscript use PT or Behavioral Fluency?

- If you are not using the chart, it is not PT. Focus on fluency.
- Talk about fluency and the importance of fluent performance. This is a really great sell. Dr. Kerri Milyko is masterful at describing fluent performance, more people should listen to how she describes PT to uninformed audiences.

For contact information and other resources that Dr. Milyko has developed go to [www.precisiontlc.com](http://www.precisiontlc.com).

- A good resource on how to talk about fluency is [www.fluency.org](http://www.fluency.org)
• Use of the PT term should not be as important as describing how we use it. For example, with behavioral fluency we may apply PT in understanding the topic, but if we submitted a paper the focus would lie with behavioral fluency, not PT.

• It would be useful for PT folks to show what PT can do (in terms of focusing on countable measures built to fluent performance) without pushing so hard about publishing data on the chart.

• The clear distinction between PT and behavioral fluency is important; there is a lot of confusion out there about what PT actually is!

_How can I present PT in an accessible way to the reviewer/reader?_

**Step 1: Be Clear!** I think it is important that authors are clear on what PT is what PT is not - the clearer our own community is on this, the better we will be able to communicate this in our publications. The behavior analysis community at large is not particularly clear on what PT is, how it is situated in behavior science and informed by other intellectual traditions, or how it is distinguished from other fluency-based methods and practices within applied behavior analysis.

**Step 2: Consider Your Audience.** No reason to be bashful about being a precision teacher. Messaging should be tailored to the audience. When speaking to behavior analysts, quote Skinner about rate as the unit of analysis and standardized measurement (the cumulative record) being his greatest contributions to science. For an audience of educators, our tendency is to browbeat them; try instead to frame PT as a source of empowerment for educators. Find a common bad-guy (common-core, school administrators, mentalists, etc.) and common cause (helping children, building better systems,
creating business results, etc.) with your audience and present PT as a solution/tool/equipment.

**Step 3: Assume Lack of Knowledge.** I have usually assumed that the editors (and most readers) were untrained in the SCC and simply explained it in the methods section. An advantage of that approach is that it sort of forces you to be clear about why the chart is good for that particular data set / problem and you can tacitly assume that they would want to use the best method too, and just bypass any argument.

**Step 3: Have the data to back it up.** It’s ok to have a paper that says "the chart is better" - but you should have data / outcomes that actually demonstrate "better", and that can be difficult / lengthy.

**Advice on Displaying Data**

*What are some methods for displaying data?*

- Semi-log axis graphs (multiply/divide axis along the left) such as those created in GraphPad Prism, and Excel.
- Electronic Standard Celeration Charts such as The One Year (TOY) SCC (Graf, Auman, & Lindsley, 2007)
- Scanning
- Online charts (e.g., AimChart) can be used to capture a full chart.

*Is it alright to stray from chart conventions when editors request it?*

Our mission is to uphold and advance the defining features and conventions of the Standard Celeration Chart. Therefore, it is preferable to seek out and submit papers to journals in which we can publish our work, which includes the publication of the chart. Stay as close to chart conventions as you can (use semi-log axis in excel graph, for example). There is a good example of alternative displays of PT study data.
published in EJOBA (for example, see Figure 1, Stromgren, Berg-Mortensen & Tangen, 2014). This is a great resource for informing guidelines about alternative displays.

Consider using numerical summaries of celeration data, too. The quantification of learning or behavior change (celeration), variability, accuracy, steps, etc. is as important as the SCC. That would include tables of celerations, accuracy ratios, bounce, etc. That is an important aspect of our work that is not widely used even by SCC people, but it is one of the things that makes our work, and Og’s contributions, so important. We are the first people who know how to simply quantify learning independent of performance, because of the chart we use. We can quantify it as well as graph it.

*Should I ever consider withdrawing a manuscript from a journal?*

Journals are like grad school admissions; they actually need you more than you need them. Imagine what happens to a journal that has no submissions- it dies, just like a school program with no students. So if you are having difficulties with an editor, you can just politely say that your paper seems like a bad fit with their policies and then submit it to a different journal. No journal has a corner on science.

*Is it possible to publish both full charts and small chart snippets?*

Yes, for example, articles have been published in both *Exceptionality: A Special Education Journal* and *Behavioral Interventions* which display data on chart snippets. See chart Figure 2 (*Datchuk, Kubina & Mason, 2015*) and Figure 3 (*Merbitz, Millar, & Hanson, 2000*). The rule about snippets is that the angles have to remain standard. Draw a diagonal up and across from the same point on the diagonal. That process will keep your aspect ratio correct and allow you to have a convenient number of days/cycles.
What has been your most successful modification to the chart for publication?

Make the SCC as close to a linear chart as possible. If the presentation looks similar to what reviewers see most often, a much higher probability exists that they will accept the visual display. I have a drawing program called Adobe Illustrator and take out very specific parts of the charts so that I maintain the integrity to the best of my ability. See Figure 4 (Kubina, Yurich, Durica, & Healy, 2016). Additionally, the use of the SCC often results in a lot of “white space” in the graph (areas that are not used by data)—this is something that editors often try to avoid. See chart example Figure 4 (Kubina et al. 2016; multiple baseline across participants, snipped charts, white background).

Could you share some advice on how to justify the use of a chart to an editor?

- Make it clear in the study description that the chart was critical to your findings, results and methodology, and why this component would be necessary for replication.

- You may mention these two aspects:
  - Log axis (multiply/divide) allows for different kinds of data analysis than equal-interval axes
  - Standardization of the chart allows for easy comparisons across evaluations. Note: this latter advantage is not salient for publication because the scale of the figures is different across journals.

- The most important thing is to have something to say. If the chart shows it best, you should use the chart and switch journals if the editors do not agree and insist on your changing display. If the chart isn't the best, switch displays (e.g., a cumulative record does a different, but still important job). Usually,
for single subject data, the chart is clearly better, shows more information, and allows clearer inference.

- If you could show the power of the technology (including the use of the SCC as part of an intervention package, but showing the publication data on a more traditional graphical display), it might be a “foot in the door” to publication of SCC data. The power of the technology can be demonstrated through the behavioral outcomes of properly executed PT practices: behavioral fluency.

**General Advice for the Future**

1. Research studies must be well-designed and executed.
   a. Those interested in publishing in mainstream behavior-analytic journals should seek mentorship or collaboration with researchers who are familiar with those requirements.
2. We must present compelling visual displays along with our data.
3. Studies with multiple participants will likely have more of an impact than studies with one participant, since this allows for replication of findings and contributes to build an evidence-base for PT.
4. We need exemplary PT research articles that clearly use standard experimental designs (i.e., multiple baseline, multi-element).
5. Component analyses or studies that examine discrete elements of PT would be beneficial in honing future practitioner-based research.
References


From article: “Personal Best, Stability and Endurance score details at M1/D1 and later M/D tests for some PT group participants”.

Copyright 2014 by Taylor & Francis Group, LLC. Reprinted with permission.

From Article: “Frequency of correct and incorrect word sequences per 1-minute across consecutive calendar days. SI and FBPC D sentence instruction and frequency building to a performance criterion. Dots are correct words sequences. Xs are incorrect word sequences”.

Copyright 2015 by Taylor & Francis Group, LLC. Reprinted with permission.

From article:
“Frequencies of correct inferences on the First and third cycles through Mindbender problems 1±22”

“Figure 2 shows the patient's frequency of correct inferences per minute for each of the 22 problems in the set, during the first and third times he cycled through the set (over the course of 95 calendar days). Cycle 2 fell between the others and was omitted for clarity, and cycle 4 was not complete at discharge.”

Copyright 2000 by John Wiley & Sons, Ltd. Reprinted with permission.

From Article:
“Four Standard Celeration Chart segments displaying baseline, FBPC for SAFMEDS, and maintenance data for Group 1 participants. The data appear in calendar time to reflect the effects of absences and time off”

“The figures have an exact portion of the SCC that places behavior within calendar time, shows proportional changes of behavior, and permits the quantification of important change measures (Pennypacker et al. 2003). Displaying participant data within the context of time demonstrates how the intervention affected each participant as it occurred temporally with breaks shown for weekends and sick days. Additionally, the SCCs quantify the following important features of visual analysis: trend, trend stability, variability, immediacy of an effect, and the consistency of data patterns across phases (Barlow et al. 2009; Fisher et al. 2003; Kazdin 2011; Kennedy 2005; Kratochwill et al. 2013; Parsonson and Baer 1978).”