Building a Better *Psychological Science*

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University of British Columbia

Summer Institute

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BITSS

Berkeley Initiative for Transparency in the Social Sciences

The State of *Psychological Science* (PSCI) in 2012

- 2726 manuscripts submitted; most high quality and some simply superb.
- Yet, seldom did submissions to the journal ….
  - justify their sample sizes,
  - report effect sizes,
  - or make it plain that no pertinent variables (independent or dependent) had been dropped.
- And prospective power analyses appeared about as often as Halley's Comet.

Disclosure Statement Pilot Project (Winter 2013)

- Publication of Joe Simmons, Leif Nelson, and Uri Simonsohn's paper (2011) on the role of experimenter-degrees-of-freedom in the emergence of false-positive effects.
- Development of **PsychDisclosure** by Etienne LeBel and his associates. Provides authors with a platform for publicly disclosing four categories of methodological details: Data Exclusions, Manipulations, Measures, and Sample Size.
- Importantly, none of these four categories must be disclosed under the then-current current reporting standards of major journals in psychology, including PSCI.
- Yet, one can reasonably argue that all four categories are essential for interpreting psychological science.

Disclosure Statement Pilot Project: Overview

- Aims were to (1) assess authors' willingness to disclose methodological information that is not normally reported, under current publication guidelines, and (2) develop a clear picture of what "Disclosure Statements" would look like, should we decide to add them to future PSCI articles.
- Over a six-week period (February & March 2013), invitation letter and survey emailed to the corresponding authors of 243 PSCI manuscripts, usually within two days of manuscript submission.
- 145 surveys completed and returned (60% response rate).
- For all studies reported in the manuscript, authors were asked to respond to four statements. All statements came from the PsychDisclosure project, with minor changes in wording.

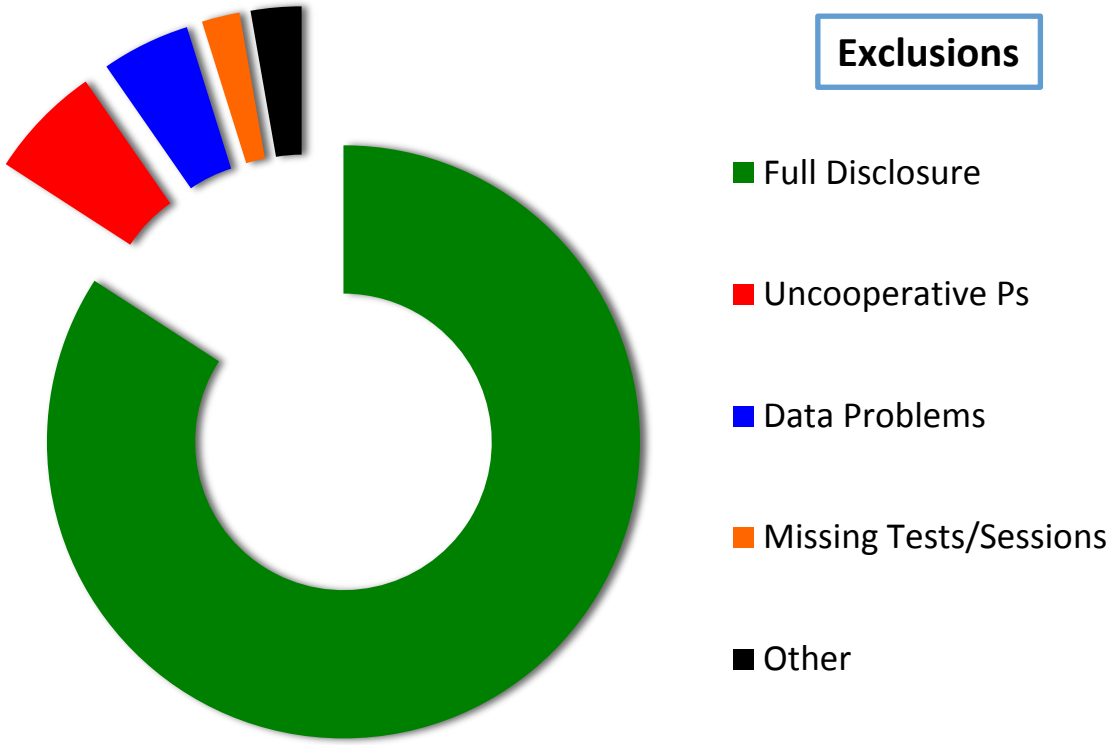
Disclosure Statement Items & Findings

(1) We reported the total number of observations that were excluded (if any) and the reasons for doing so. (If no observations excluded, mark Yes.) Yes: ___ No: ___

If no, please report this information here (e.g., data from 3 participants in Study 2 excluded due to computer malfunction; 4 participants in Study 1 excluded for not following instructions):

(2) We reported all independent variables or manipulations, whether successful or failed. Yes: ___ No: ___

If No, please provide brief explanation for not reporting this information (e.g., critical software implementation error; editor suggested we drop condition A in Experiment B):


Exclusions
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Data Problems
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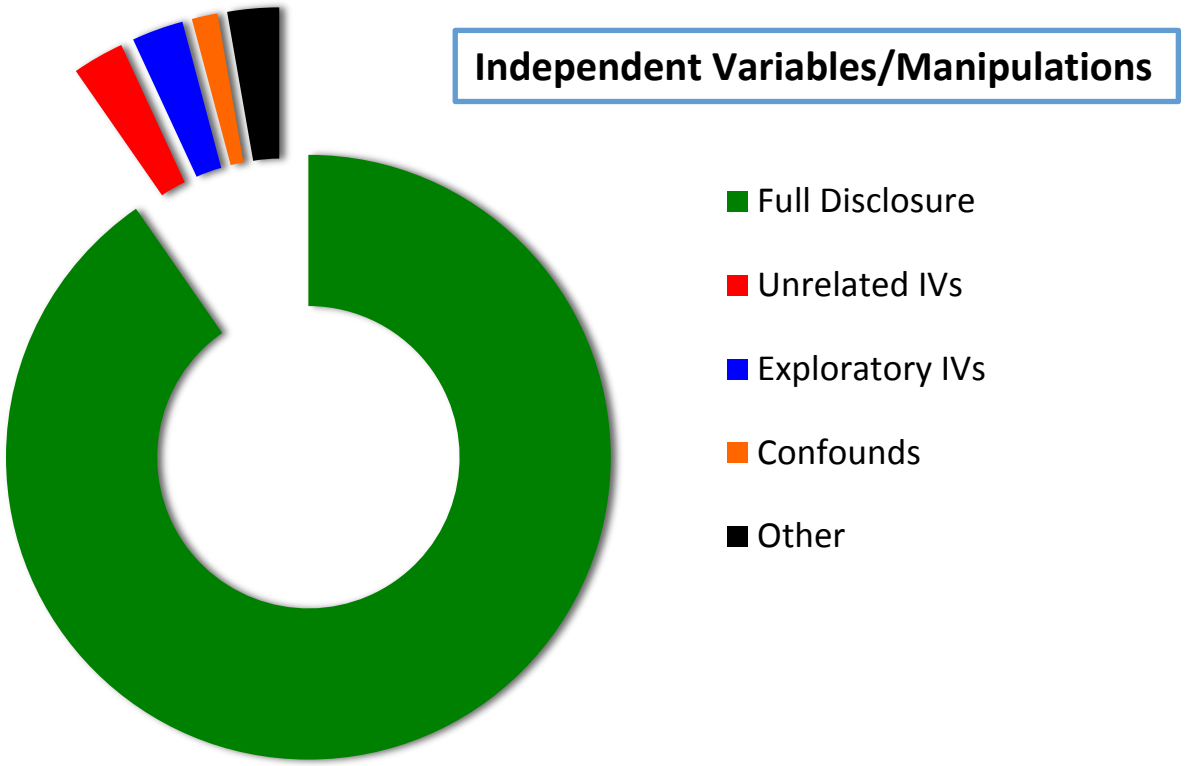
Other


Independent Variables/Manipulations
Full Disclosure
Unrelated IVs
Exploratory IVs
Confounds
Other

(3) We reported all dependent variables or measures.

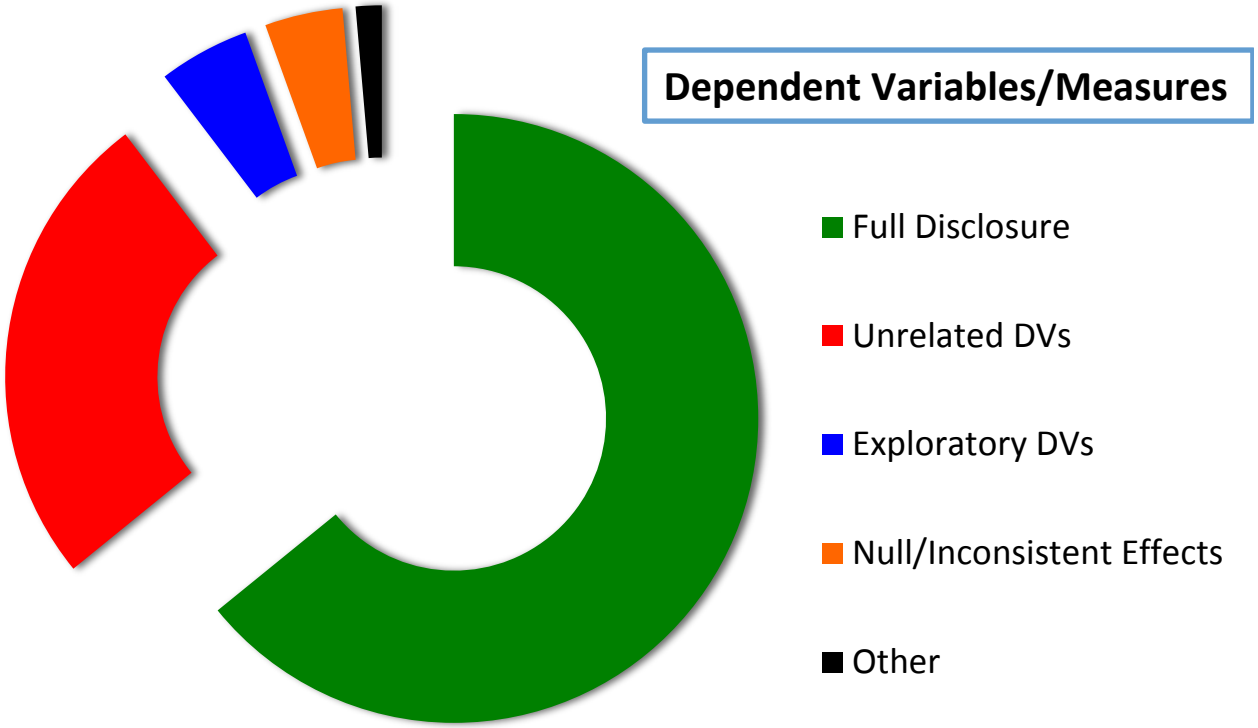
Yes: ___ No: ___

If No, please provide brief explanation for not reporting this information (e.g., measures not related to research question; unreported questionnaire items insufficiently reliable).

(4) We reported how we determined our sample size.

Yes: ___ No: ___

If No, please describe (a) the rationale for the sample sizes used and (b) how you decided to stop collecting data (e.g., decided in advance to collect data until minimum sample size achieved and this was followed; sample size determined by power analysis but not achieved by the end of term).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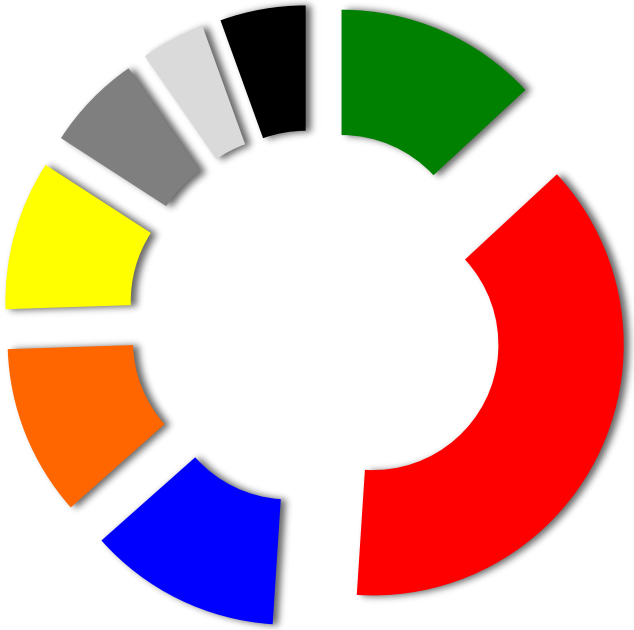
Exploratory DVs
Null/Inconsistent Effects
Other



Sample Size

- Full Disclosure
- Previous Findings
- A Prior Decision
- Guesstimate
- Power Analysis
- Practical Considerations
- Opportunity/Convenience
- Other

Follow-Up Questions

- How long? Mean = 8 minutes; Median = 5 minutes. 83% of Disclosure Statements completed in 10 minutes or less.
- How informative/important? 12% negative, 88% positive. But, keep in mind that this was a self-selected sample.
- Feedback?
  - *Expand the Disclosure Statement to cover analyses performed, but not presented in the main text.*
  - *Ask about additional studies, including pilot studies, that explored the same research question but that were excluded from the main text.*
  - *Disclosure Statement is OK, but Psych Science should take the lead in publishing all data, codes, and materials.*

  - We'll revisit each of these recommendations at the end.

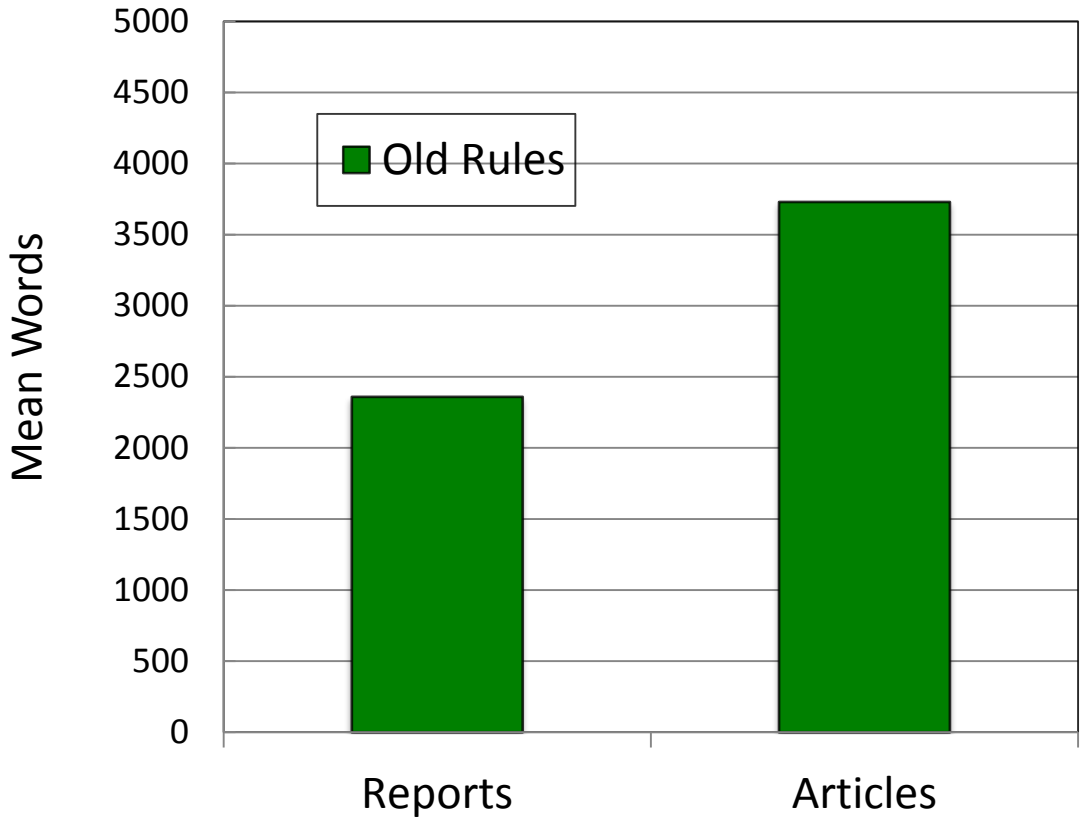
Summary & Recommendations from Pilot Project

- Items included in the Disclosure Statement speak to four basic elements of scientific method: Were there any data exclusions, dropped manipulations, or dropped measures, and how was sample size determined? None of these are abstruse bits of methodological arcana.
- And yet, in less than half of the sample of submissions (61/145 or 42%) were any three of these elements already covered in the main text.
- Further, the percentage of manuscripts containing all four elements (10%) was comparable to the percentage that contained none of them (4%).

- Disclosure Statements pick up important information in an efficient and easy manner: They are completed quickly (10 minutes or less), with little trouble (few if any complaints about the items being unclear or unfair), and evaluations of the Statement's utility were mostly positive.
- May 2013 APS talk: I recommended that *Psychological Science* begin to (1) require authors to file Disclosure Statements upon manuscript submission, and (2) actively encourage authors to post their data publicly and preregister their studies (to promote transparency and deter file-drawer problems).
- This two-part recommendation is among the five new initiatives that took effect in January 2014.

Revising Word Limits

- Research Articles (RAs) and Research Reports (RRs) account for 83% of submissions to PSCI.
- In 2013 and earlier, RAs were limited to 4000 words while RRs were capped at 2500 words, all in.
- Beginning January 2014, the Method and Results sections of a manuscript are excluded from these word limits. The new limits on RAs and RRs are 2000 and 1000 words, respectively, which includes introductory and discussion sections as well as notes, acknowledgements, and appendices.
- Purpose is to afford authors the opportunity to report what they did, and what they found, in a manner that is clear, concise — and complete. New limits may also increase submissions reporting multiple studies.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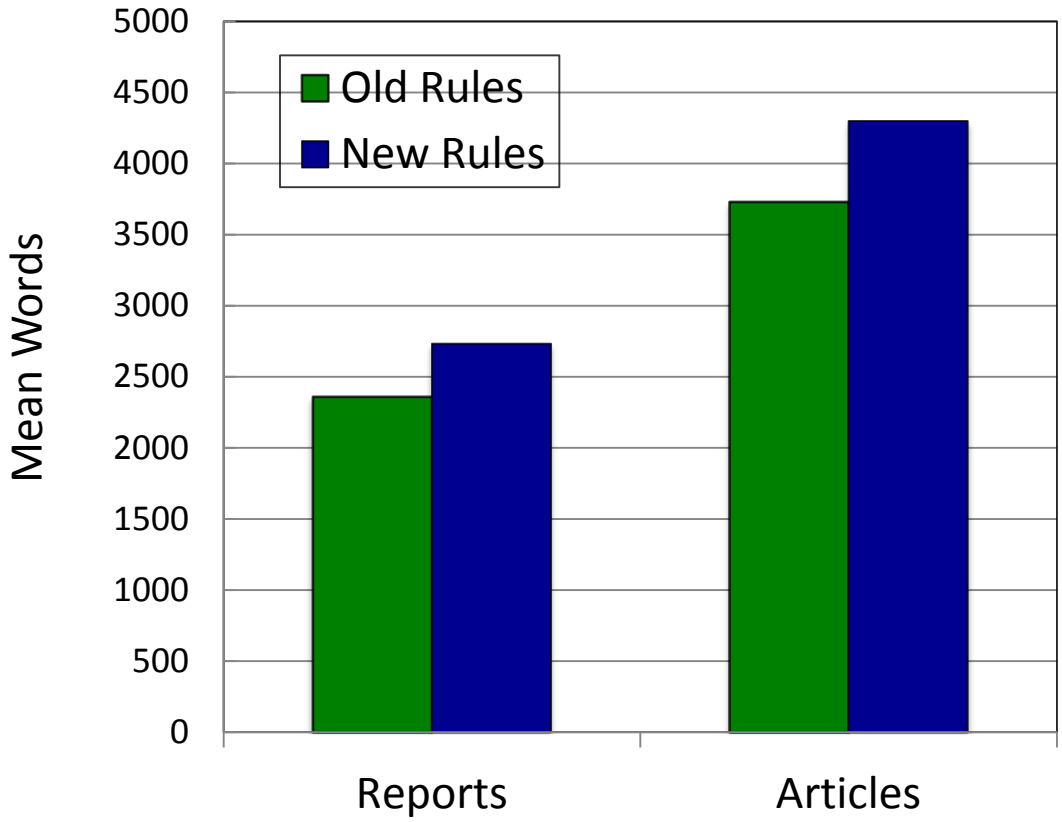
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Five Initiatives for 2014

- (1) Enhance the Reporting of Research Methods and Results
- (2) Revise Word Limits on Research Articles and Research Reports
- (3) Clarify Criteria for Manuscript Evaluation
  - *What is it that the reader will learn from this article that she or he did not (or could not) have known before?*
  - *Why is this knowledge important for psychology?*
  - *How are the claims made in the article justified by the methods used?*

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- (4) Embrace the New Statistics

Embracing the New Statistics

- *Psychological Science* now recommends the use of the "new statistics"— effect sizes, confidence intervals, and meta-analysis — to avoid problems associated with null-hypothesis significance testing (NHST).
- To aid researchers in shifting from reliance on NHST to estimation and other preferred techniques, the January 2014 issue of PSCI included a tutorial by Geoff Cumming.
- Tutorial features examples and references to books, articles, software, and online calculators that will help authors in understanding and implementing estimation techniques in a wide range of research settings.
- New stats recommended, not required. Bottlenecks include the need for better and broader education; special needs of fMRI researchers; etc.

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- (5) Promote Open Scientific Practices

Promoting Open Practices

- *Psychological Science* was a launch vehicle for a Center for Open Science program that seeks to incentivize open communication within the research community.
- Articles accepted in 2014 or later may qualify for as many as three different badges to recognize authors for making their data, materials, or preregistered design and analysis plans publicly available.

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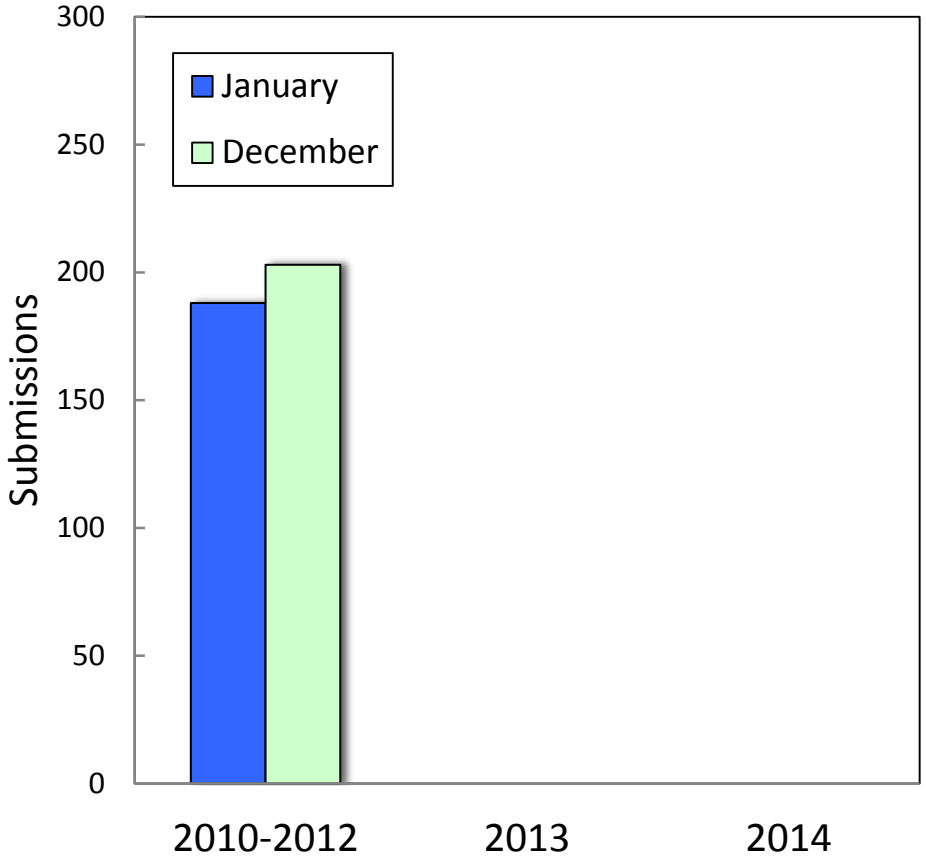
- So, what are the consequences?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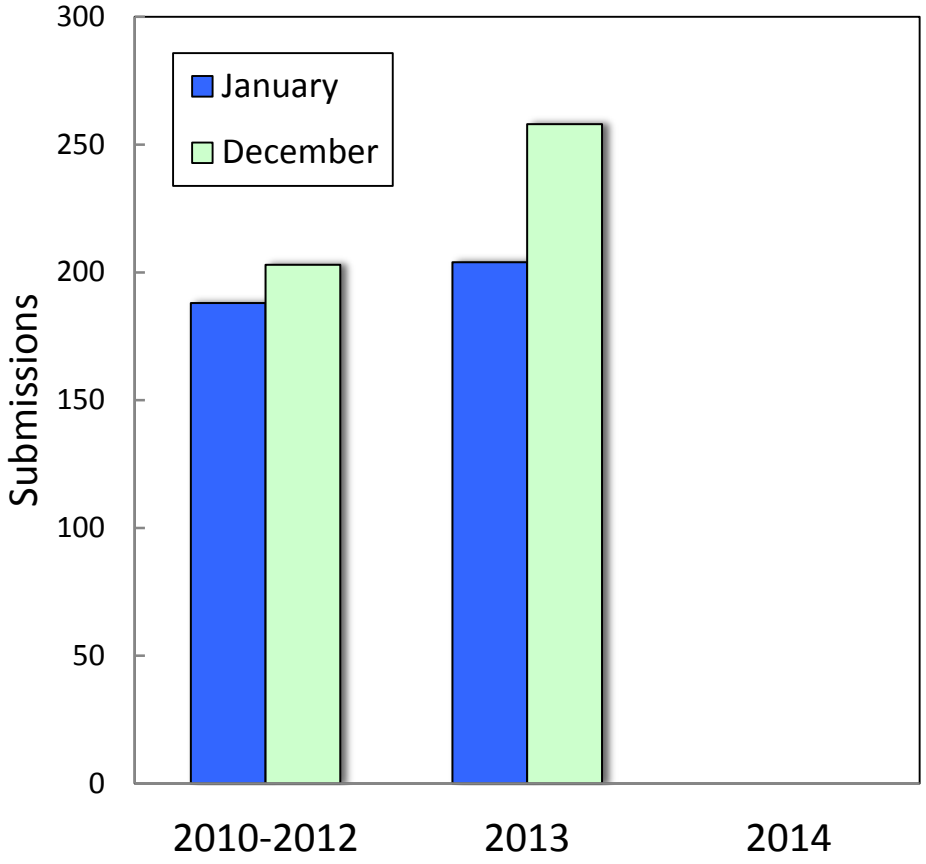
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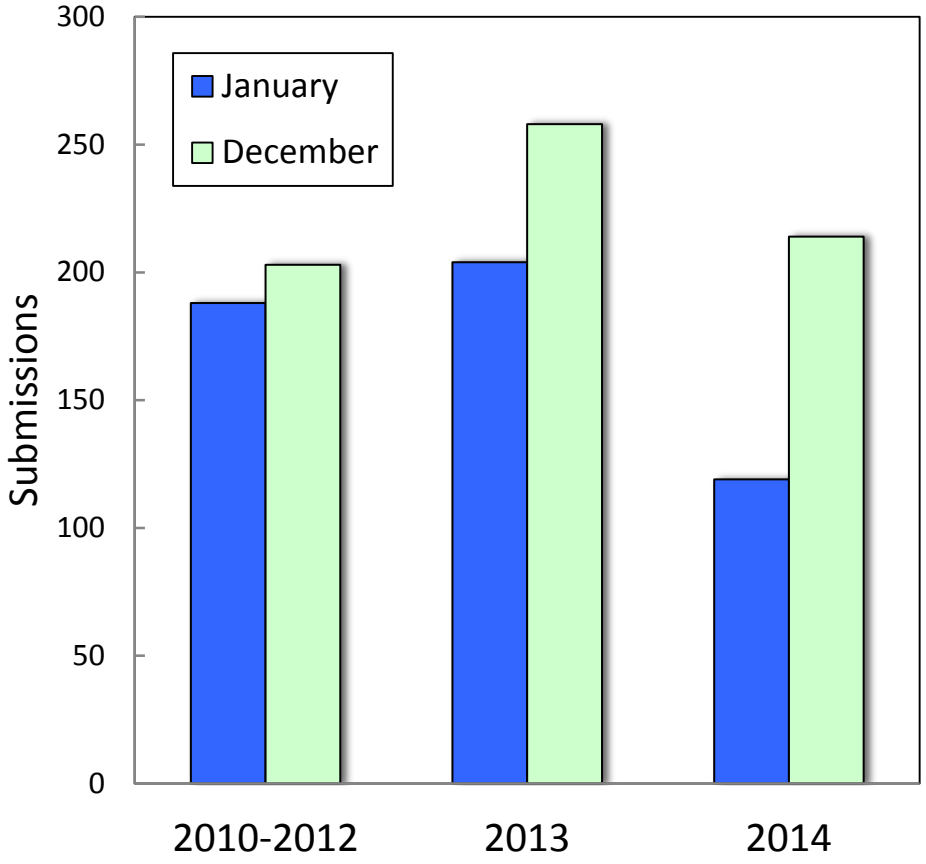
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Recent or Pending Initiatives

- Continue to publish direct replications of findings reported in PSCI. However, going forward, such replications must (a) be preregistered for methods and analysis plans, and (b) pertain to findings published no more than 3 years earlier. [Effective May 2015]
- Add **Visualized Methods** notation to Open Materials badge. [May 2015]
- Open Materials badge can be earned by including annotated code or syntax used for all principal analyses. [June 2015]
- [Pending] For accepted manuscripts, post Disclosure Statements online as reviewed supplemental material (SOM-R).
  - Alternatively, during revision, move key contents of the Disclosure Statements into the main text.
  - In some cases, a hybrid model might work, with a short synopsis in the text and (if needed) a more detailed discussion of specific issues (e.g., unreported measures) posted online.

Initiatives Shifted, Dropped or Delayed

- Original plan (in 2013) was for PSCI to publish multiple, direct, preregistered replications of interesting findings. Shifted this to Bobbie Spellman's journal, *Perspectives on Psychological Science*, which seemed to be a better vehicle.
- Feedback from the Disclosure Statement (DS) pilot project:
  - *(1) Expand the DS to cover analyses performed, but not presented in the main text.*
  - *(2) Ask about additional studies, including pilot studies, that explored the same research question but that were excluded from the main text.*
  - *(3) DS is a step in the right direction, but Psychological Science should take the lead in publishing all data, codes, and materials.*

Dropped Initiatives

- *(1) Expand the Disclosure Statement (DS) to cover analyses performed, but not presented in the main text.*
- Several people, mostly those working in large research teams, said they don't keep track of every analysis they run and that doing so would disrupt the team's workflow.
- Others said this item is presumably intended to get at tested but ignored alternative specifications (e.g., include vs. exclude outliers; log vs. square-root transform). They weren't convinced that this item would help matters, and I came to agree: Instead of reporting all of their analyses, authors should provide their data and code. (More on this in a moment.)

Dropped Initiatives

- *(2) Ask about additional studies, including pilot studies, that explored the same research question but that were excluded from the main text.*
- Many felt this would open a large can of worms. Leif Nelson: ”It is all too easy for a researcher to think that an excluded study doesn't count. Furthermore, this actually puts a meaningful burden on the ‘full disclosure’ researcher. [The other DS items] are equally easy for everyone to answer; either that information is in text or they write it down right now. But [this item] is different. The researcher who convinces herself that the excluded study doesn't count has now saved herself the hours it might take to write it up for this query. File-drawering studies is damaging, but I am not convinced that this will solve that problem.”

Delayed Initiative (?)

- *(3) Disclosure Statement is a step in the right direction, but Psychological Science should take the lead in publishing all data, codes, and materials.*
- At least for now, the most we can do is nudge authors to share their materials, data, and code and to preregister their studies (hence the badges).
- Sharing is commonplace in economics, political science, and other disciplines, but the impetus mainly came not from the top down (e.g., by journal or funder decree), but from the bottom up (i.e., by leading researchers taking the initiative.
- BITSS, and other forward-leaning organizations, will play a crucial role in achieving the transparency that is part and parcel of your name.

http://www.psychologicalscience.org/index.php/replication


OPEN DATA


OPEN MATERIALS


PREREGISTERED

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- (2) Revise Word Limits on Research Articles (RAs) and Research Reports (RRs)
  - Old rules: RAs = 4000 words and RRs = 2500, both all in
  - New Rules: RAs = 2000 and RRs = 1000, including everything *except* Methods and Results

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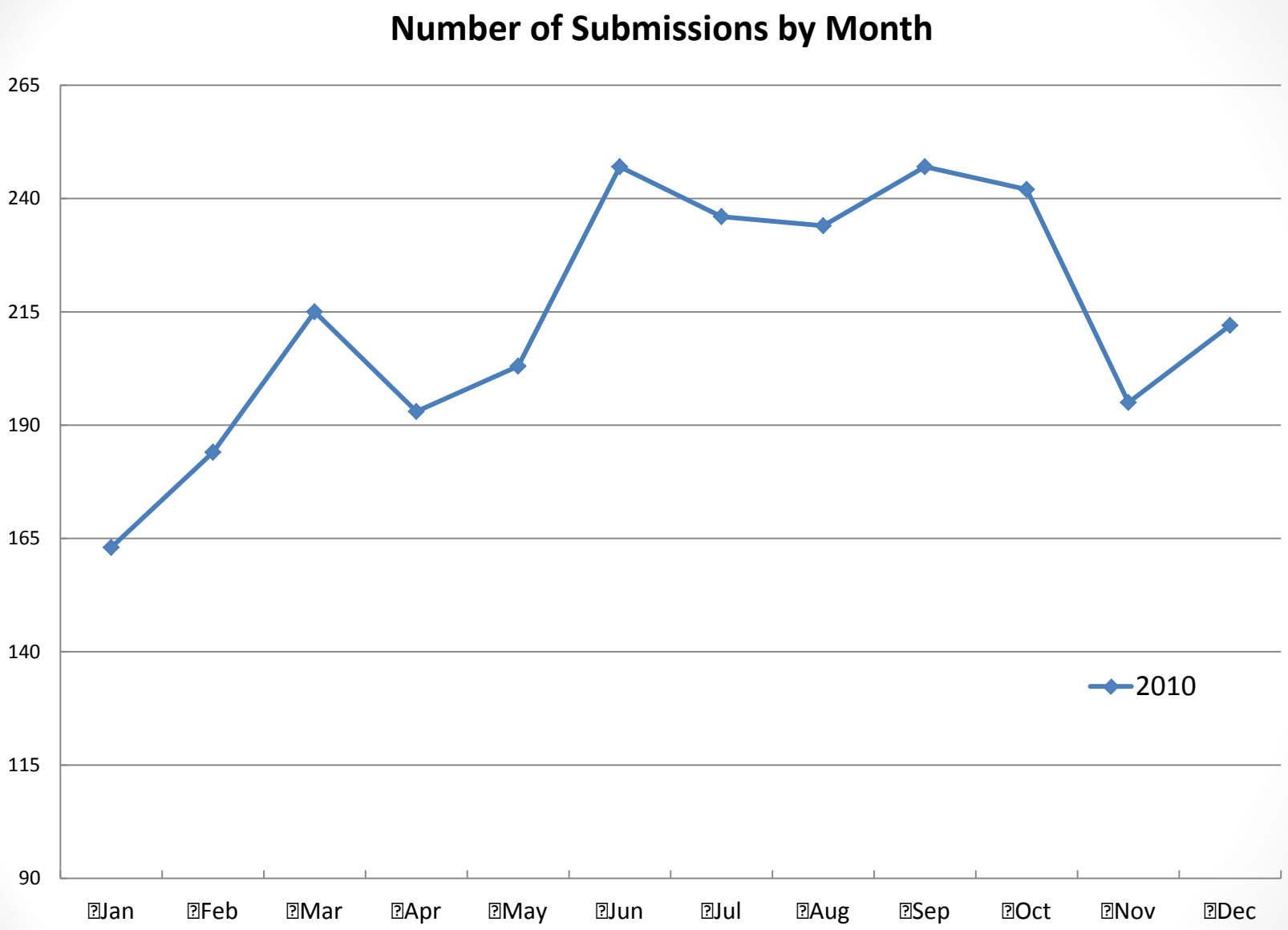
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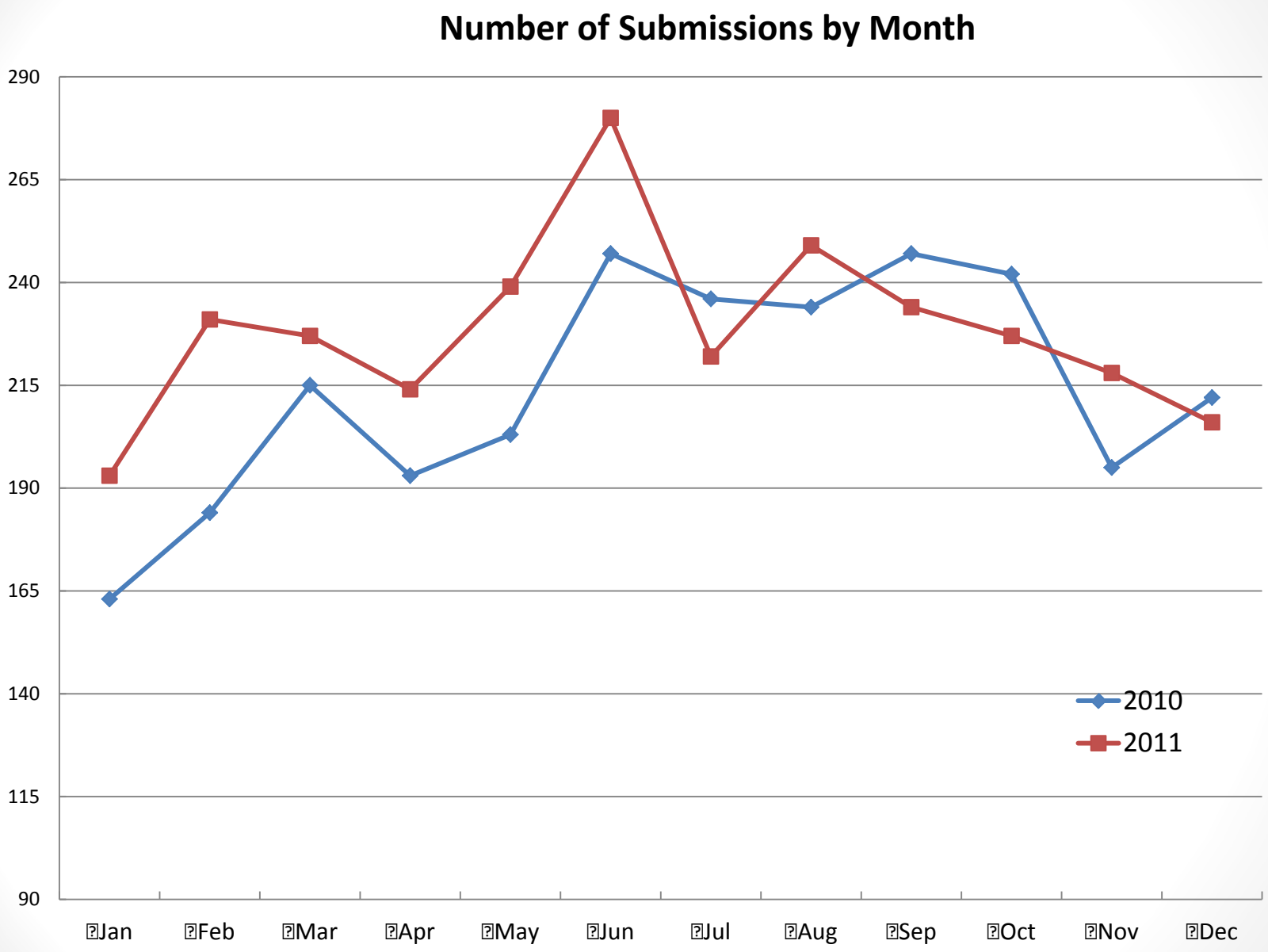
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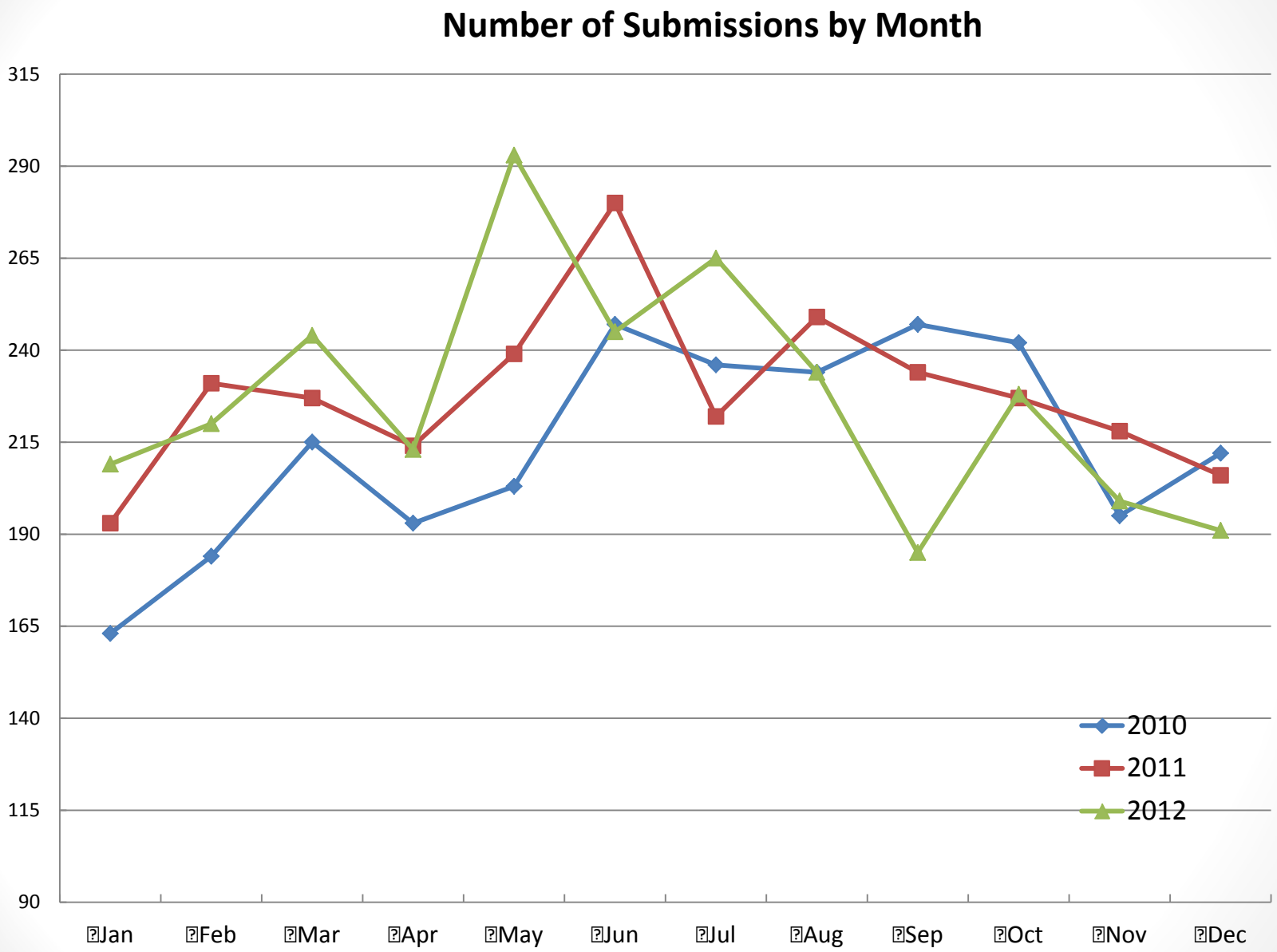
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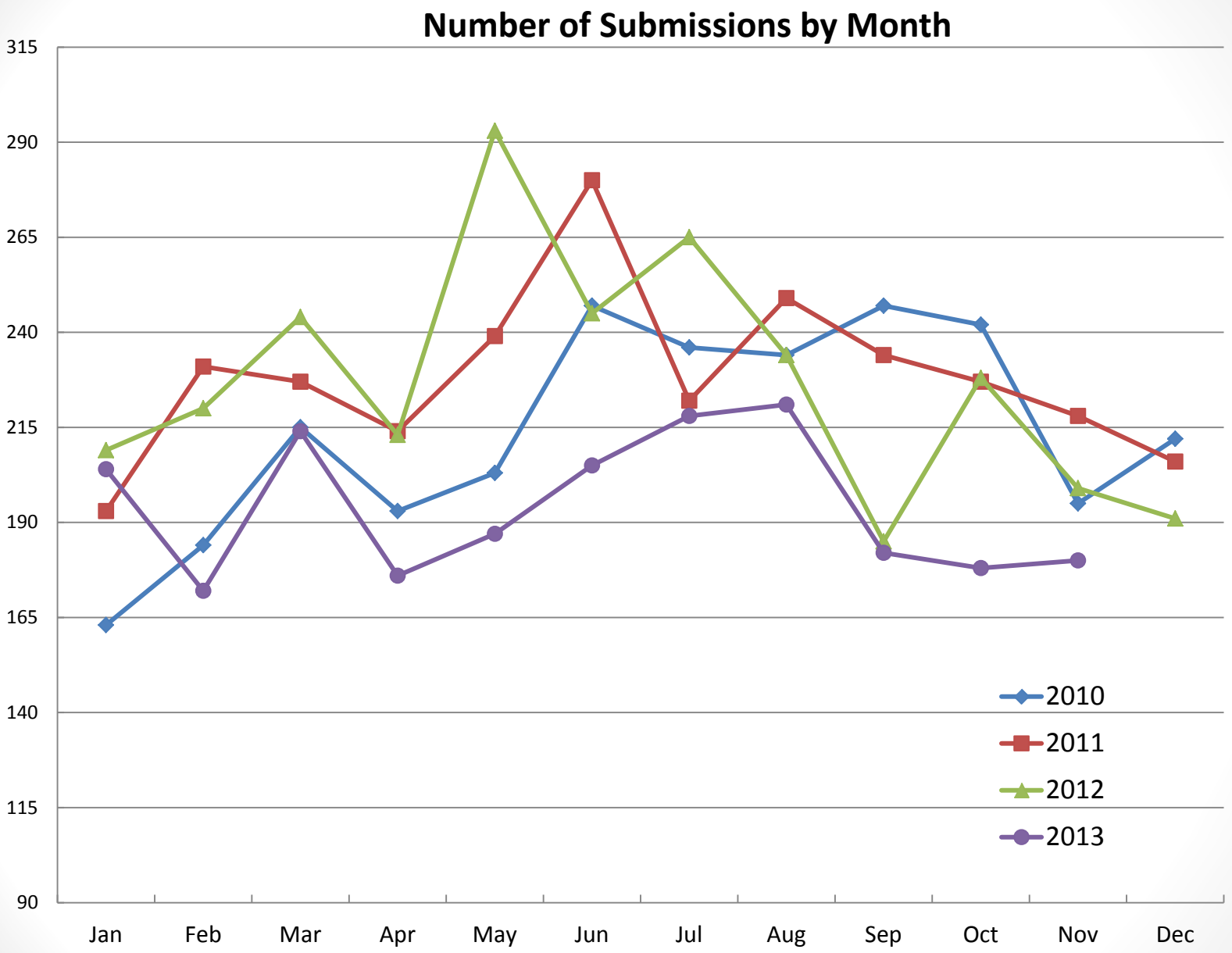
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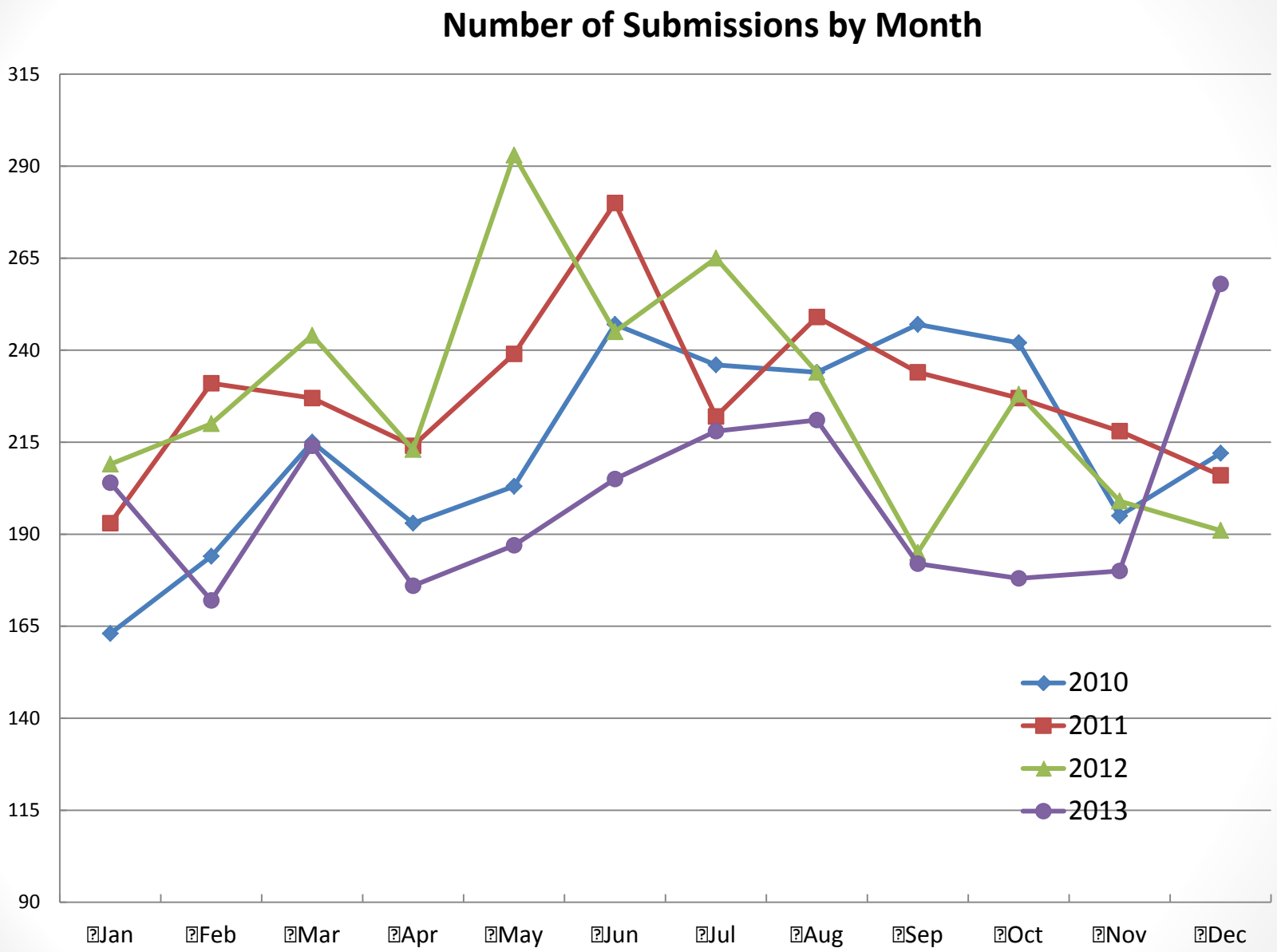
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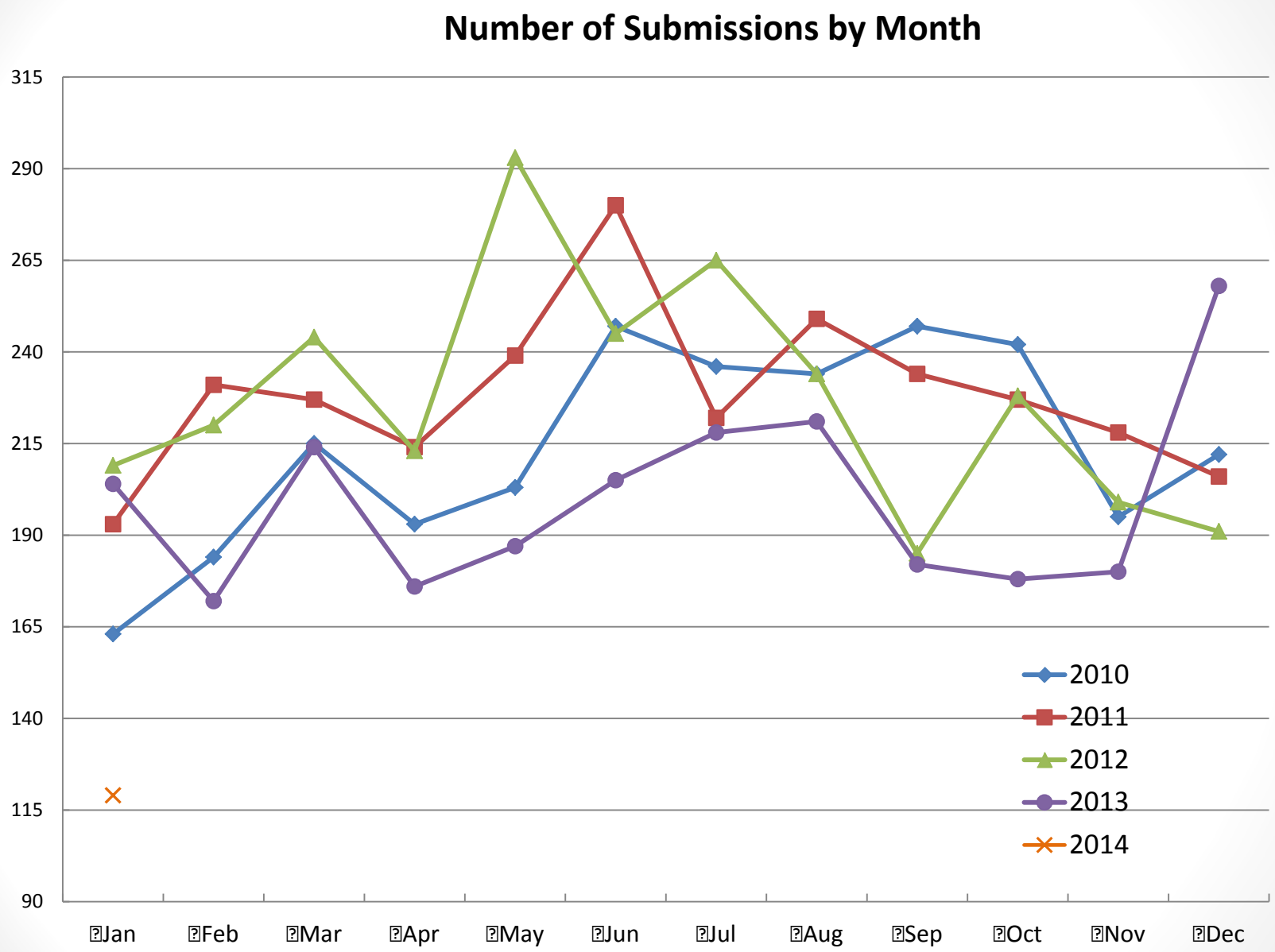
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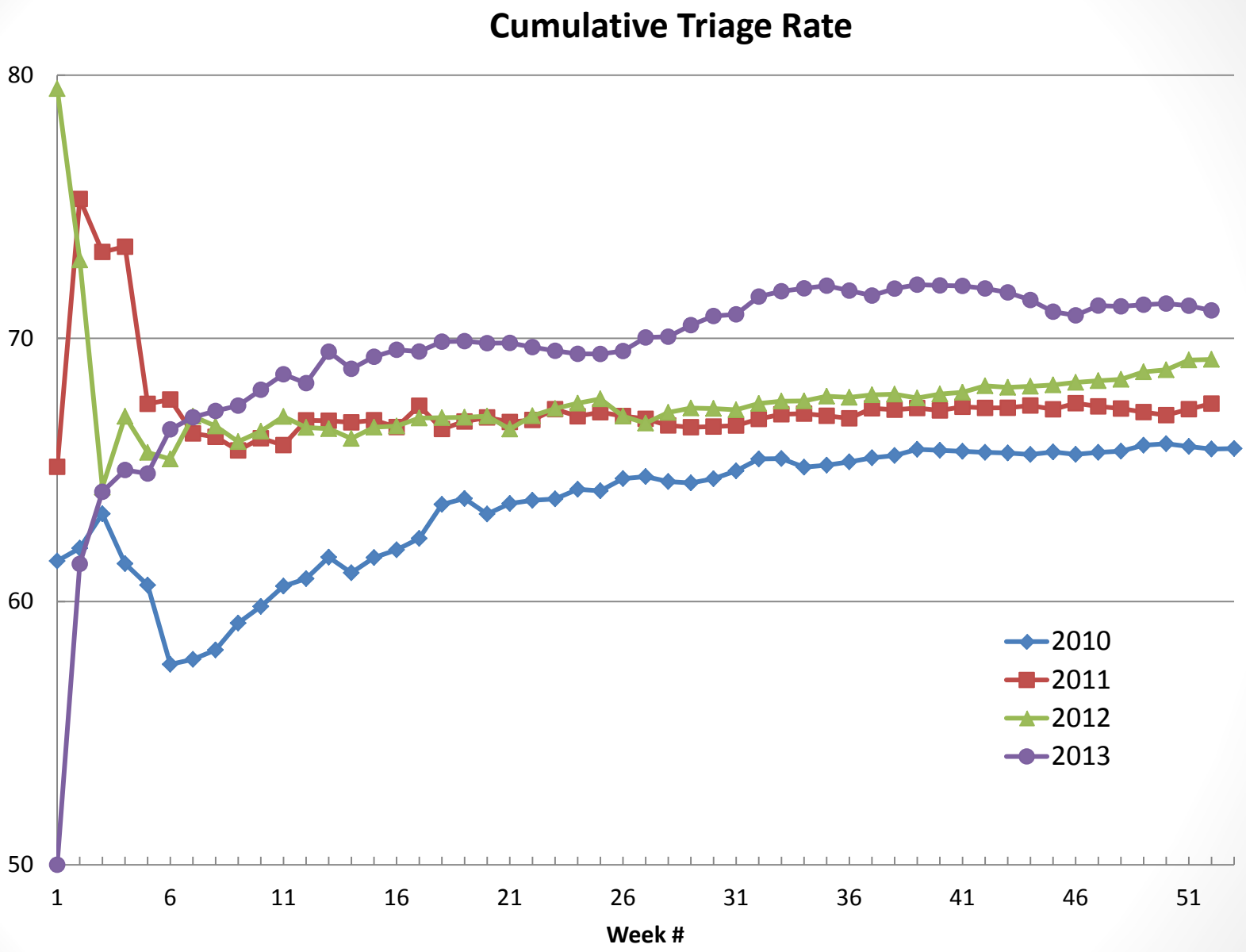
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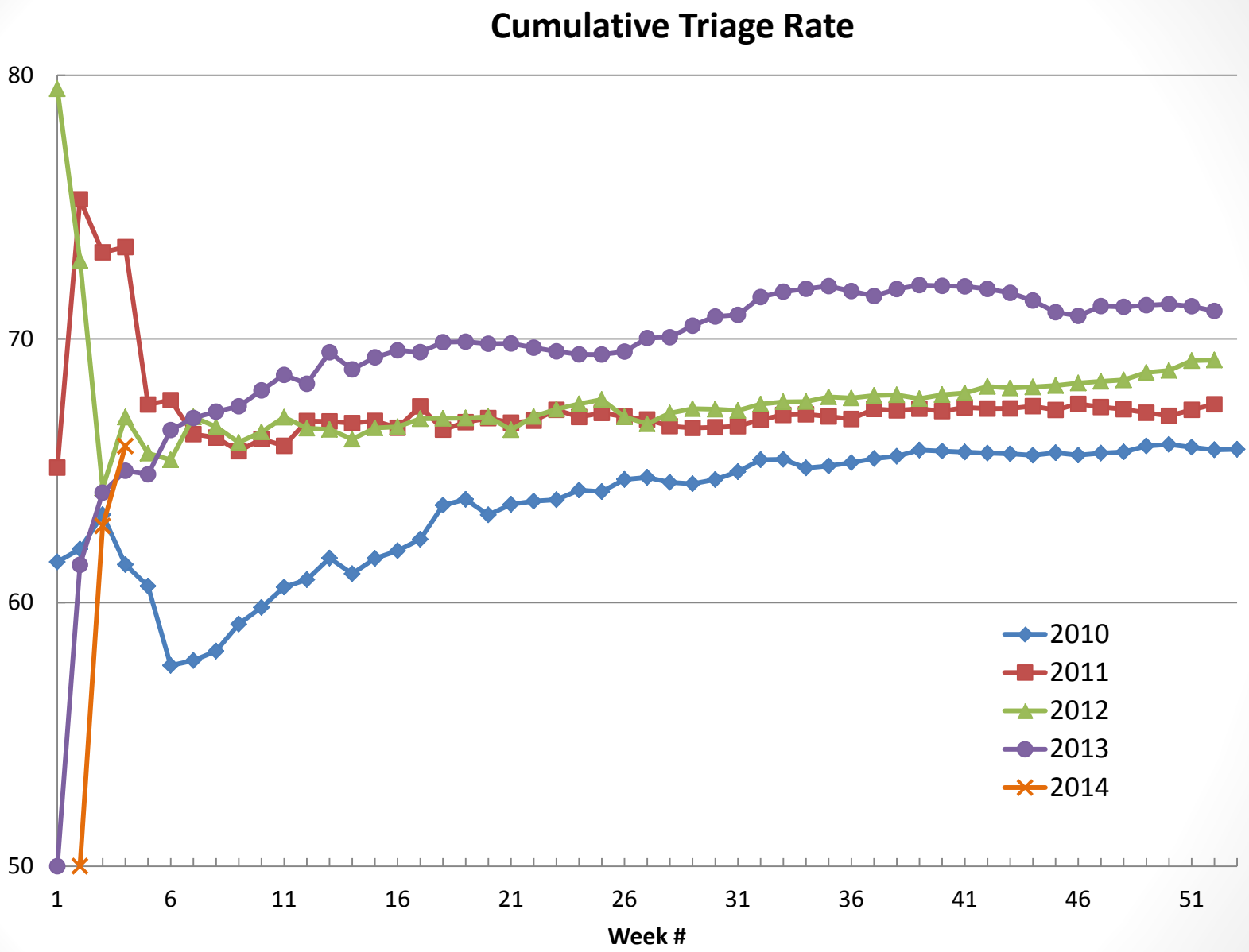
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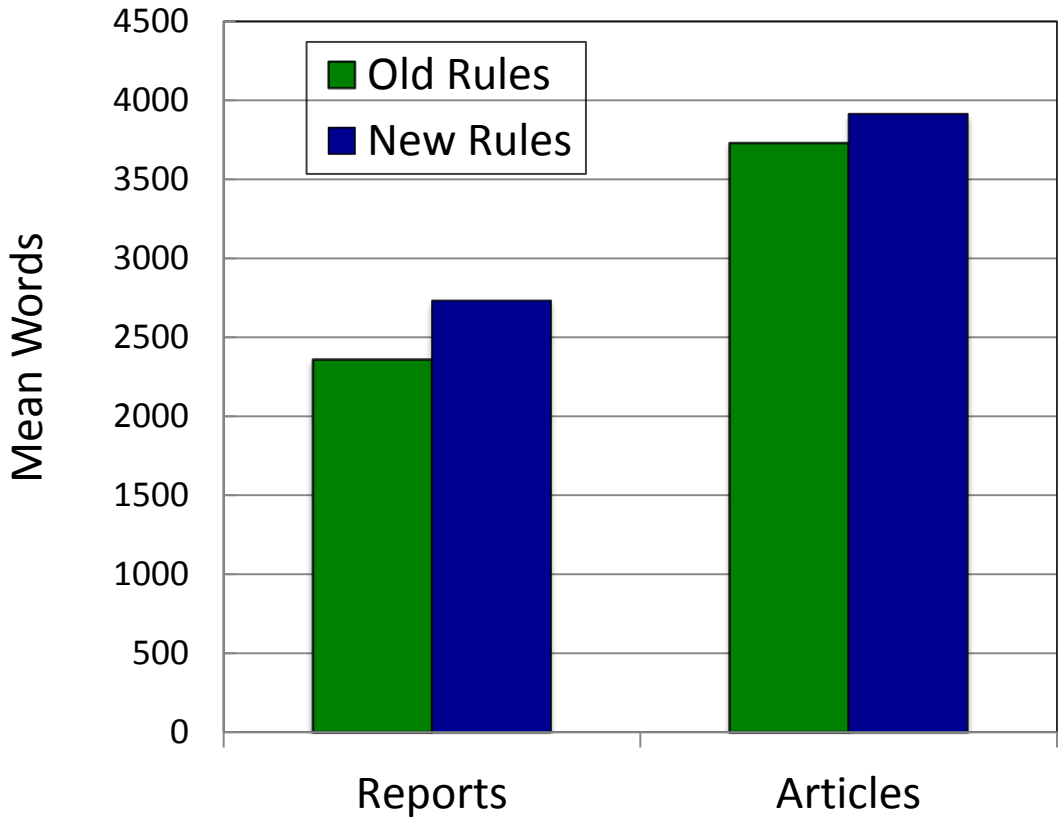
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Old Rules
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Reports
Articles

Clarifying Evaluation Criteria

- Beginning in January 2014, editors and external referees are asked to evaluate submissions to the journal with three questions in mind:
  - (a) What will the reader of this paper learn about psychology that she or he did not know (or could not have known) before?
  - (b) Why is that knowledge important for the field?
  - (c) How are the claims made in the paper justified by the methods used?
- Manuscripts that provide clear and compelling answers to these “What,” “Why,” and “How” questions will have the best prospects of being accepted for publication.

Embracing the New Statistics

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RR	36%	37%	34%	31%	21%
SR	14%	14%	11%	12%	5%

RA = Research Article (max 4000 words prior to 2014)
RR = Research Report (max 2500 words prior to 2014)
SR = Short Report (max 1000 words, all years)


BITSS
Berkeley Initiative for Transparency in the Social Sciences

Building a Better *Psychological Science*

Eric Eich
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Summer Institute
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