

# Practical Research Tips

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# Data Management & Analysis

# Data Management

You need to protect data from...

- Hacking/snooping
  - Equipment failure
  - Fire/flood/disaster
  - Your future self
- Your data aren't state secrets or plans for the new iPhone, but they still contain personal or sensitive information about individuals.
  - We make assurances of confidentiality to our participants and to the human research ethics committee.
  - Also representing UofW and the field of psychology.

# Avoiding Data Loss to Hacking/Snooping

- Minimize identifying or sensitive information – if you don't need it, don't collect it.
- If you must collect it, keep identifying information (name, email) separate from data
- Avoid sending data by email
- Avoid file sharing (e.g., Dropbox)
- Use strong passwords
- Consider encryption – either whole disk or just your data files
  - BitLocker (included with some versions of Windows)
  - VeraCrypt
  - PGP

# Avoiding Data Loss to Equipment & Disaster

- Digital data is both VERY easy to lose if you have a single copy, also basically impossible to lose if you're doing proper backups
- Buy an external harddrive and copy your data regularly
- Automated solutions: use windows backup or many free and paid software options
- "3-2-1" Backup strategy
  - 3 copies of your data
  - 2 of which are local but on different media
  - 1 of which is offsite\*
- \*Offsite could be secure ("zero knowledge") cloud storage.
  - Resilio, SpiderOak, Tresorit
- Guard your passwords because properly encrypted data is irrecoverable if the password is lost.

# Data Management: Your future self (and advisor) will thank you

- Think: In five years will I remember what I did? Could someone else figure out what I did?
  - Keep multiple versions of your data file (e.g., “original raw data” and “working data”)
  - Label your variables – use the variable and value labels in SPSS
  - Use syntax as a record of your analyses and keep comments in your file
  - Use filter variables instead of deleting participants – you’ll need to account for them later (e.g., in # of participants deleted, suspicious, not used)

# Data Quality Control

- Red herrings
  - “Please choose ‘strongly disagree’ for this item.”
  - “It is better to do good than to do evil.”
  - “All in all, most charities do more bad than good.”
- Post hoc cleaning
  - metadata [timing, device used, location]
  - data checks [response patterns, missing data]
- Importance of a priori criteria!
  - Simmons, Nelson, & Simonsohn (2011)

# The Perils of Data Cleaning Done Wrongly

# Bennett et al. (2009)

## METHODS

Subject. One mature Atlantic Salmon (*Salmo salar*) participated in the fMRI study. The salmon was approximately 18 inches long, weighed 3.8 lbs, and was not alive at the time of scanning.

Task. The task administered to the salmon involved completing an open-ended mentalizing task. The salmon was shown a series of photographs depicting human individuals in social situations with a specified emotional valence. The salmon was asked to determine what emotion the individual in the photo must have been experiencing.

Design. Stimuli were presented in a block design with each photo presented for 10 seconds followed by 12 seconds of rest. A total of 15 photos were displayed. Total scan time was 5.5 minutes.

- Some data analytic procedures used for fMRI didn't properly correct for multiple comparisons.
- e.g., looked like a dead salmon showing brain activation to face presentation

# Bem (2011)

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2011, Vol. 100, No. 3, 407–425

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0022-3514/11/\$12.00 DOI: 10.1037/a0021524

## Feeling the Future: Experimental Evidence for Anomalous Retroactive Influences on Cognition and Affect

Daryl J. Bem  
Cornell University

The term *psi* denotes anomalous processes of information or energy transfer that are currently unexplained in terms of known physical or biological mechanisms. Two variants of *psi* are *precognition* (conscious cognitive awareness) and *premonition* (affective apprehension) of a future event that could not otherwise be anticipated through any known inferential process. Precognition and premonition are themselves special cases of a more general phenomenon: the anomalous retroactive influence of some future event on an individual's current responses, whether those responses are conscious or nonconscious, cognitive or affective. This article reports 9 experiments, involving more than 1,000 participants, that test for retroactive influence by "time-reversing" well-established psychological effects so that the individual's responses are obtained before the putatively causal stimulus events occur. Data are presented for 4 time-reversed effects: precognitive approach to erotic stimuli and precognitive avoidance of negative stimuli; retroactive priming; retroactive habituation; and retroactive facilitation of recall. The mean effect size (*d*) in *psi* performance across all 9 experiments was 0.22, and all but one of the experiments yielded statistically significant results. The individual-difference variable of stimulus seeking, a component of extraversion, was significantly correlated with *psi* performance in 5 of the experiments, with participants who scored above the midpoint on a scale of stimulus seeking achieving a mean effect size of 0.43. Skepticism about *psi*, issues of replication, and theories of *psi* are also discussed.

*Keywords:* *psi*, parapsychology, ESP, precognition, retrocausation

- A paper supposedly demonstrating a physically impossible finding [precognition] managed to get published in a top social-personality journal.
- Suggested that something was missed in peer review, or maybe systematically wrong.
- Created increased scrutiny towards and discussion of research practices and data analytic approaches.

# Simmons et al. (2011)

General Article

## **False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant**

**Joseph P. Simmons<sup>1</sup>, Leif D. Nelson<sup>2</sup>, and Uri Simonsohn<sup>1</sup>**

<sup>1</sup>The Wharton School, University of Pennsylvania, and <sup>2</sup>Haas School of Business, University of California, Berkeley



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sagepub.com/journalsPermissions.nav  
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http://pss.sagepub.com  
SAGE

- aka the “p-hacking” paper
- Showed that small choices that seem reasonable in isolation can have a dramatic effect on type I error rate
- Demonstrated it’s easier than most people thought for researchers to fool themselves into thinking they have a finding which might be just sampling error or noise.

# False Positive Psychology: “p-hacking”

(Simmons, Nelson, & Simonsohn, 2011)

## “Researcher Degrees of Freedom”

1. Should we collect more data?
  2. Should we exclude some observations?
  3. Which conditions should be included?
  4. Which control variables should be considered?
  5. Which measures should be included or combined?
- aka, choices researchers make that may be reasonable but carry risk of inflating type I error rate.

# Author Recommendations (Simmons et al., 2011)

1. Decide and disclose data collection rules
  2. Collect > 20 participants/cell\*
  3. List all variables collected
  4. Report all conditions including failed manipulations
  5. Report eliminated observations & results if they're included
  6. Report results with and without covariates
- i.e., if you're making choices about data cleaning, they should be done in advance and done without considering their effect on the effect itself.
  - \*20/cell is now considered too low. Best practice is doing a power analysis.

# Center for Open Science (2013)

- Brian Nosek, Virginia
- Promote openness, integrity, and reproducibility of scientific research
- One solution: “Preregistration”
- <http://cos.io>

# The How-To Section

# Setting up Studies in SONA

- SONA: <https://uwinnipeg.sona-systems.com/>
- Creating studies
- Excluding previous studies
- Prescreen qualifications
- Timeslot considerations
- Automatic credit granting via Qualtrics

# SONA Prescreen

Sometimes you want to recruit only certain types of participants. Three ways of doing this:

1. Exclude anyone who doesn't meet your criteria after-the-fact. Not recommended because very inefficient (in time and credits).
2. Include criteria in study description. Very flexible but requires participants to read and self-select.
3. Prescreen function. Behind the scenes and participants are masked to screening criteria, but limited number of screening criteria available. Example on right of selecting female participants only.

Prescreen Restrictions	YES <a href="#">View/Modify Restrictions</a>
------------------------	---

Section 1

Next we ask several background questions.

(age)  
How old are you?

(gender)  
With which gender do you identify?

Next we ask several background questions.

(gender)With which gender do you identify?

Choices:

Female

Male

Another gender identity

[Save Changes](#)

# Prescreen Items 2018-19

1. With which gender do you identify?
2. What is your ethnicity/cultural background? Please choose the category that you most identify with.
3. What is your current relationship status?
4. How would you classify your vision?
5. What is your citizenship status in Canada?
6. Is English your first language? That is, the language you learned first and spoke most often at home during childhood?
7. Politically, how do you identify yourself?
8. How important is your political orientation to your self-identity?
9. Are you easily startled?
10. How frequently do you do yoga (either in classes or at home)?
11. Do you experience ASMR [extended description of ASMR]?
12. Can you give yourself goosebumps just by thinking about it?

# Lab vs. Online

## Lab

- Wider range of possible procedures
- “Closer” to data—interaction with participants gives a sense of whether procedure works
- Higher experimental control
- More tolerance of lengthier procedures
- Difficult to recruit non-students

## Online

- Larger samples without corresponding increase in effort
- Reduce potential for experimenter effects
- Loss of experimental control [are they doing your study on the bus?]
- Rapid increase in participant fatigue [~10 mins ideal]
- Easier to recruit non-students

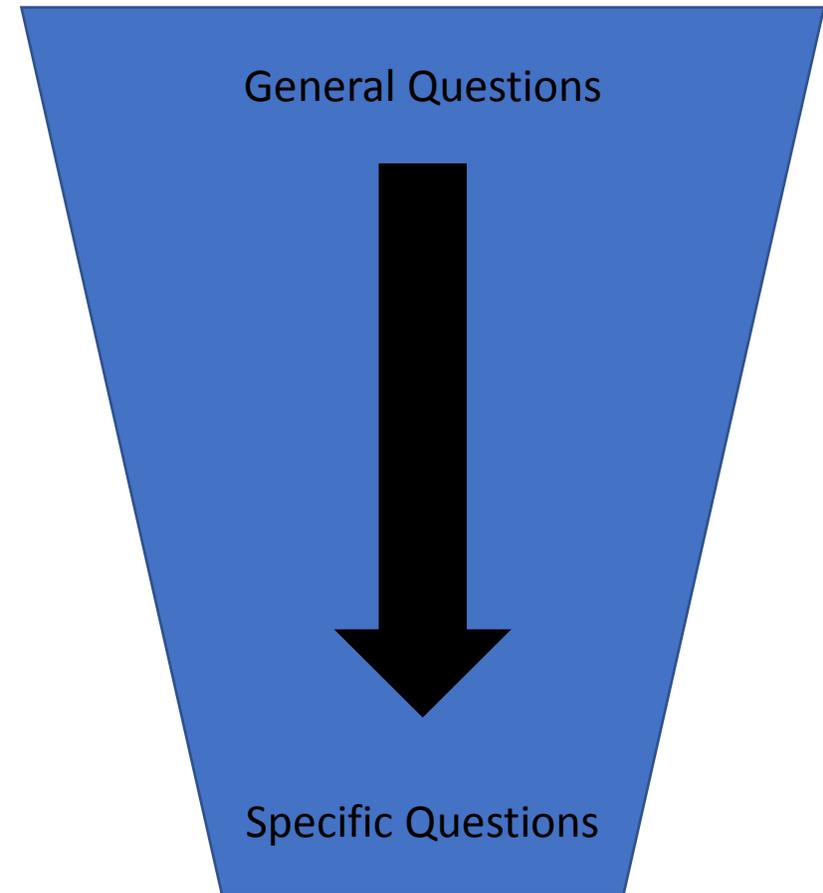
# Interacting with Participants

- Be polite & professional – they're doing you a favour!
- Be affectively neutral
- Be consistent across participants
- Professional/causal clothes. Avoid messy/ripped clothes, logos, & scents
- Be masked to conditions if possible
- Record anomalies

# Funnel Debriefing (Chartrand & Bargh, 1996)

Dual purpose procedure that allows you to (a) assess suspicion from participants and (b) alert participants to deception & restore trust with them

- What did you think of the study? Do you have any comments?
- Were there any parts of the study that seemed odd or confusing in some way?
- As you were going through the study, were there any parts that seemed more than what was explained? Or more than meets the eye?
- Sometimes in psychology experiments, there are aspects of the study that we can't tell you initially. Do you think there could have been anything like that in this study? If yes, what?
- You're on the right track! Let me explain. As you've probably guessed based on these questions, there were some aspects of this study we left out...

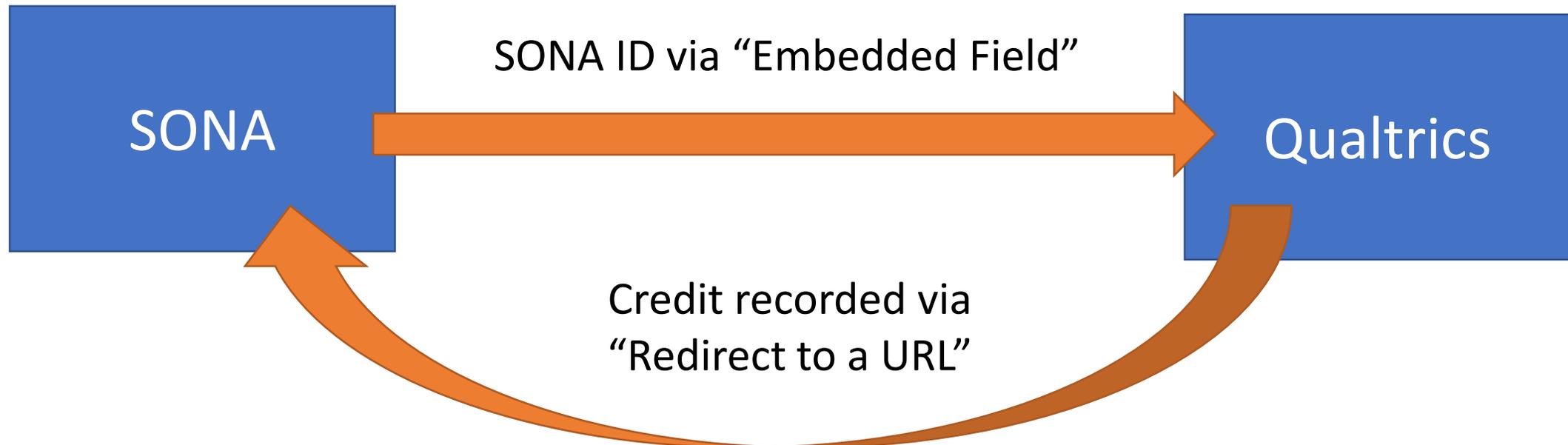


# Qualtrics

- Online platform for administering surveys
- Get a UW account:  
<http://ion.uwinnipeg.ca/~clark/research/qualtrics.html>
- Qualtrics Website:  
<https://uwinnipeg.ca1.qualtrics.com/ControlPanel/>

# Getting Participants From SONA->Qualtrics

- SONA tracks credits
- Qualtrics collects data
- Problem: how can we tell who has finished a study?



# Automatic Credit Granting: Step 1

- After you design your study in Qualtrics, click “Distributions” -> Anonymous Link.

- Receive a link (URL) that looks something like this:

**[https://uwinnipeg.qualtrics.com/jfe/form/SV\\_0CBekWlgqKZSG4I](https://uwinnipeg.qualtrics.com/jfe/form/SV_0CBekWlgqKZSG4I)**

- When you enter that URL into SONA, append: **?id=%SURVEY\_CODE%**

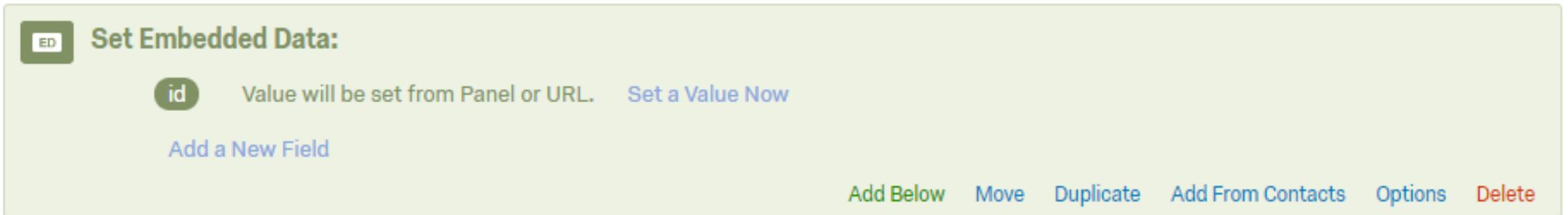
[https://uwinnipeg.qualtrics.com/jfe/form/SV\\_e592XokLzqRJAGh?id=%SURVEY\\_CODE%](https://uwinnipeg.qualtrics.com/jfe/form/SV_e592XokLzqRJAGh?id=%SURVEY_CODE%)

If the text %SURVEY\_CODE% is included in the URL, the system will replace that with a unique code for the participant, to make it easier to identify who completed the study. You can also configure it so that participants receive credit in the system immediately after finishing the survey. If you are using Qualtrics, add ?id=%SURVEY\_CODE% to the end of the URL to make use of this feature.

[Detailed Help](#)

# Automatic Credit Granting: Step 2

- Create an embedded field within Qualtrics to capture the SONA ID.
- Click “Survey Flow” -> “Add New Element” -> “Set Embedded Data”
- By setting up an Embedded Field, the SONA ID for each participant gets saved in your data file as “id”.



The screenshot shows the 'Set Embedded Data' configuration screen in Qualtrics. It features a green header bar with a small 'ED' icon and the title 'Set Embedded Data:'. Below the header, there is a single field configuration for 'id', which is described as 'Value will be set from Panel or URL.' and includes a 'Set a Value Now' link. At the bottom of the configuration area, there are several action buttons: 'Add a New Field', 'Add Below', 'Move', 'Duplicate', 'Add From Contacts', 'Options', and 'Delete'.

**ED** Set Embedded Data:

**id** Value will be set from Panel or URL. [Set a Value Now](#)

[Add a New Field](#)

[Add Below](#) [Move](#) [Duplicate](#) [Add From Contacts](#) [Options](#) [Delete](#)

# Automatic Credit Granting: Step 3a

- At the end of your survey, “id” can be passed back to tell SONA that the participant should be credited, via “redirect to a URL”.
- Obtain the “Qualtrics redirect to a URL” link from your SONA study page.
- This link is unique for each study – tells SONA that a specific participant completed a specific study.

## Qualtrics Redirect to a URL

```
https://uwinnipeg.sona-systems.com/webstudy_credit.asp?
```

### Instructions

You can also configure it so that participants receive credit in the system immediately after finishing the survey. If you are using Qualtrics, add `?id=%SURVEY_CODE%` to the end of the URL to make use of this feature.

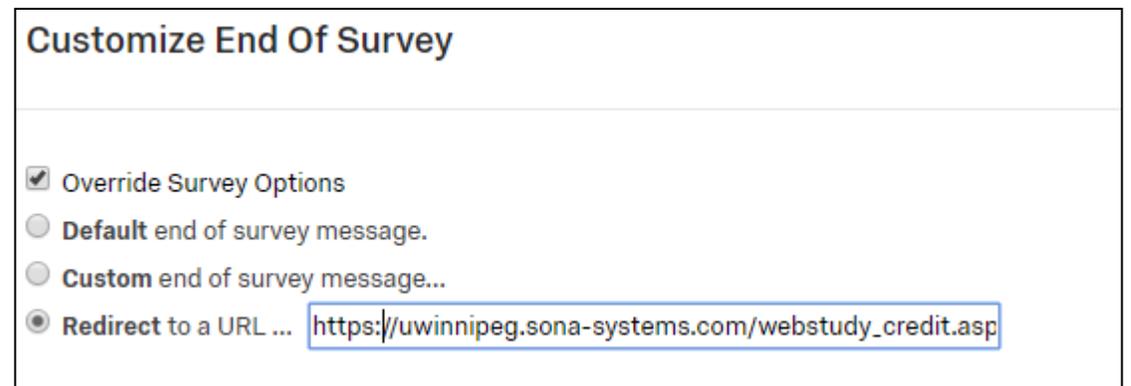
[Detailed Help](#)

# Automatic Credit Granting: Step 3b

- In the Qualtrics Survey Flow, insert an “End of Survey” element at the end of your study.



- Click “Customize” -> Override -> Redirect to the link you just copied.

A screenshot of the "Customize End Of Survey" dialog box. The title bar reads "Customize End Of Survey". Below the title bar, there are three radio button options. The first option is "Override Survey Options", which is checked. The second option is "Default end of survey message." with an unselected radio button. The third option is "Custom end of survey message..." with an unselected radio button. Below these options, there is a text input field labeled "Redirect to a URL ..." containing the URL "https://uwinnipeg.sona-systems.com/webstudy\_credit.asp".

# Automatic Credit Granting

- This only works if participants completely finish the survey.
- So, on your final page (e.g., feedback page) put a big line in red letters: **“Click NEXT >> one more time to ensure that your credit is recorded.”**
- At the your completion deadline, there will probably still be a few people listed as ‘pending’ in SONA (i.e., didn’t finish study). Download your Qualtrics data and look for their SONA number in the ID field. Grant credit to those participants whose number is in your data file, or give ‘no shows’ to people who are not there.
- In Qualtrics, before you download your data, make sure to look for “Responses in Progress” and close/record those responses. Those are people who started but didn’t complete the survey.