Practical Systems and Resources
For Conducting Research

A Guide for Incoming PhD Students in Psychology and Related Fields

PREFACE

Two truths and a lie:

1. Moving to a new city to start grad school can be challenging. Finding housing, forming routines, and meeting friends could initially consume quite a bit of time and energy.
2. Getting hit with courses in September is exciting—yet potentially stressful. One weekly deadline rolls into the next, leaving precious little time for career-advancing research.
3. Therefore, while you might keep pace in coursework and other program requirements, your research is bound to lag for at least the first two years of the PhD.

Statements #1 and #2 are truths: feeling unusually busy at the start of grad school is natural, and both professional and personal obligations might (understandably) reduce the number of hours you commit to research. Statement #3 is the falsehood: even right at the beginning of the PhD—while you are also taking courses, negotiating rent, and conquering public transit—you can take actionable steps to be productive in research.

To help you do so, I solicited input from my peers in the behavioral PhD programs at the University of Chicago, Booth School of Business. Specifically, I asked them to provide practical systems, resources, and other materials that they've found to be useful while conducting their own research. Based on their input, I wrote up this guide to help you and other incoming PhD students get off to a fast start in research even while carrying your coursework and a healthy social life in tow.

The guide is organized within three sections: Essential Systems, Supplementary Systems, and Additional Resources.

1. ***Essential Systems*** are those that are likely to enhance your productivity in research regardless of your specific interests and methods. Adopt with fervor!
2. ***Supplementary Systems*** are those that may or may not enhance your productivity in research, depending on your specific interests and methods. Adopt with discretion!
3. ***Additional Resources*** are tools that could either enhance your productivity in research directly or inspire you to form systems that will. Adopt with foresight!

Of course, this guide represents my attempt to distill what my peers and I have learned. The contents of this guide have not been peer-reviewed or otherwise critiqued by senior members of the field. When in doubt, seek input from your knowledgeable advisors and then prioritize their input. Refer to this guide as an additional source of input to jump-start your research.

You can download selected materials from the guide en masse here as a zip folder. Enjoy!

CONTENTS

ESSENTIAL SYSTEMS

Essential Systems for Analyzing, Writing Up, and Presenting Data

One Statistical Package, Most Commonly R with RStudio, Stata, or SPSS. Many students enter PhD programs with extensive knowledge of Excel and only cursory knowledge of statistical software like R, Stata and SPSS. Excel is satisfactory for computing descriptive statistics and performing t-tests, but during grad school, you will also use techniques like ANOVA, regression, mediation, and hierarchical modeling that are much more easily implemented using statistical software. With this in mind, you might consider learning one software package.

To choose your software, you might ask your advisors and colleagues which software they use as well as which software they recommend (they may provide two different answers). After you choose your software, consider re-analyzing old data sets to increase your proficiency. Your previous analyses in Excel serve as error checks, and as you replicate these analyses, you will slowly accumulate working knowledge of the new software package.

> ➢ R and RStudio can be downloaded here and here; SPSS here; and Stata here.

Essential Systems for Collecting and Managing References

One Reference Manager, Most Commonly Mendeley or Zotero. As a research assistant or lab manager, you likely read papers related to your PI's ongoing research, and to store these papers, it's possible that you built a local folder structure on your computer. One common experience during grad school (spoiler alert!) is that students encounter far more papers during the PhD than they did as a research assistant or lab manager. Your local folder structure still might suffice, but if you store references in multiple locations, they may become more difficult to find or categorize.

Reference managers are programs that store and organize your references in one central location. When you encounter an article that you think you'll want to see again, you save the PDF to the reference manager and place the article into the corresponding folder within the reference manager. Then you revisit the reference manager later when you want to read this paper again. Reference managers are beneficial above and beyond local folder structures because they also allow you to filter by *meta-data*—fields like title, author, journal, and year of publication—and they also provide built-in tools for annotating text including highlights and notes. If you select Mendeley, consider downloading Mendeley Desktop as well as installing the Mendeley toolbar plug-in for Word.

> ➢ Mendeley can be downloaded here; Zotero here.

SUPPLEMENTARY SYSTEMS

Supplementary Systems for Designing and Implementing Studies

TurkPrime. Many graduate students conduct online studies through Amazon Mechanical Turk, and doing so requires performing rather tedious operations like plugging survey links into source code, manually rejecting HITs, and assigning qualifications. TurkPrime is a platform designed to make these tasks easy for academic researchers like you. The platform connects directly to your Amazon Mechanical Turk ("MTurk") account and streamlines the process of launching and managing your HIT. In addition, TurkPrime comes with an optional "micro-batch" feature which halves MTurk fees from 40% to 20% without any of the gymnastics that are necessary to implement the same work-around within MTurk directly. If your lab manager has not yet switched to TurkPrime, consider urging him or her to do so! You will save time, your advisor will save funds, and your research will move along a bit more quickly as a result.

  ➢ TurkPrime can be accessed here.

G*Power. Before launching any study, you and your advisors will select how many subjects to recruit. Recruit too few and you may not detect an effect even if one exists; recruit too many and you will spend more time and resources than the study requires. G*Power conducts power analyses: you input statistical parameters like the type of statistical test, the size of the predicted effect and the alpha level, and G*Power indicates the required sample size per cell to achieve the specified power. During study design, consider using this tool to conduct power analyses, then share the outputs with your advisor before you pre-register or launch.

  ➢ G*Power can be downloaded here.

Study Checklists. Most studies are simple to implement, and 90% of the time they launch seamlessly without a single hitch. Nevertheless, errors and omissions do happen on occasion and one straightforward way to catch these issues ahead of time is to use a checklist. Consider using a study checklist with common steps—for example, obtaining IRB approval, creating materials, error checking the survey, and training experimenters—to ensure that your study does, indeed, run smoothly as planned.

  ➢ One set of study checklists can be accessed here.

Randomized Participant Log. Nearly all lab studies require randomizing conditions within your participant log. The attached spreadsheets make this easy: simply input the total N, number of conditions, and condition names. Then perform a few simple operations within Excel and the spreadsheet outputs the randomized participant log. If you plan to run your study in multiple locations and prefer to recruit balanced samples in each location separately, use the template for multiple study locations and the log will balance your sample in each location automatically.

  ➢ The randomized participant logs can be accessed here.

Alternative Online Subject Pools. Many researchers conduct online studies using the Amazon Mechanical Turk ("MTurk") subject pool. That said, you and your collaborators may occasionally recruit participants from alternative subject pools such as Qualtrics Online Sample, Prolific, Survey Sampling International, or Google Surveys. Each service provides access to different

demographic groups and offers different sampling methods and pricing. Browse these online subject pools and find the one that's right for your needs.

➢ Amazon Mechanical Turk can be accessed here; Qualtrics Online Sample here; Prolific here; Survey Sampling International here; Google Surveys here.
➢ SJDM provides a more extensive list of online subject pools here.

MTurk Procedures to Maintain High Data Quality. Most participants that you recruit online through MTurk will take your surveys seriously enough to provide high-quality data. However, a small number of participants are actually "bots" that provide nonsensical responses and may add noise to your data set. Consider implementing safeguards—such as requiring 99% or higher approval, requiring 1000 HITs completed minimum, recruiting only American and Canadian participants, and incorporating CAPTCHA items in Qualtrics—to reduce the number of bots that complete your surveys and, in turn, to increase the quality of data you collect through MTurk.

Audiovisual Procedures for Lab and Online Studies. The majority of studies that you implement will require only the tools that are built into Qualtrics. However, on occasion you may connect Qualtrics with other technologies—such as audio and video recordings—and this increases the chance that some participants will experience technical difficulties, especially when you recruit online. Consider developing a list of audiovisual procedures such as delaying page submit, adding attention checks, and incorporating other precautions for studies that use audiovisual stimuli.

➢ One set of audiovisual procedures can be accessed here.

Other Systems for Designing and Implementing Studies.
• *Lab Updates*. Each week, remind the lab managers which studies are ongoing and which RAs you've trained to run them. Consider ranking your studies in order of priority.
• *Study Outline Template*. While discussing study design with advisors, it's often efficient to map out procedures in Word before moving to Qualtrics (one template is here).
• *Experimenter Script Template*. One way to write scripts more efficiently—and to make things easier for experimenters—is to work from a template (one example is here).
• *Speech Transcription Template*. On occasion, graduate students or their RAs may need to transcribe speech. One template and set of procedures is provided here.
• *Qualtrics Survey Templates*. Your survey templates can incorporate font styles, themes, header code, TurkPrime codes, and blocks for manipulations and measures (see here).
• *Qualtrics Storage Survey*. Within Qualtrics, consider storing your commonly used scales and stimuli within a "storage" survey to facilitate retrieving these materials later.

Supplementary Systems for Analyzing, Writing Up, and Presenting Data
Study Results Template. After you initially analyze data, the results of the analyses are fresh on your mind. But often, the same results later get lost in disparate email threads, R scripts and SPSS exports. One way to proactively manage your data analyses is to summarize those analyses in a results document and then to send this results document to your collaborators. If

your collaborators request additional analyses, you can update the results document itself so that the results from all your analyses stay together in one place.

➢ An example template is provided in DropBox here.

R Markdown. This software integrates data analysis with traditional word processing. Analyze your data in an R Markdown file, annotate your analyses in prose, then "knit" them together by exporting to a PDF, HTML, or Word file. Consider using R Markdown to perform interim data analyses, to generate study reports to share with collaborators, or even to compile reproducible, APA-style manuscripts with statistics incorporated.

➢ R Markdown is discussed at length here.

R Script Template. If you plan to analyze your data in R, one way to make this process easier and faster is to build common operations into a template R script. For example, you might load common packages at the beginning of the script, block out sections for confirmatory and exploratory analyses, or store common syntax at the end of the script. After you gain greater facility in R, you could also use the template to write out code for common data cleaning operations like deleting unnecessary columns, merging equivalent columns, excluding participants for failed attention checks, and computing rates of both attrition and exclusion.

User-Defined R Functions. If you choose R as your statistical software, you should begin by learning basic syntax for building and manipulating data frames, computing descriptive statistics and performing basic statistical tests. Eventually, however, you may find that there are certain chunks of code that are tedious to write but which you use frequently across multiple data sets. When this occurs, you can make your life easier by coding your own user-defined function—that is, a function that you store locally on your computer and call while analyzing data. User-defined functions can be coded for a variety of purposes, from simple (but general) operations like rounding numbers to complex (and specialized) operations like cleaning data, manipulating data frames, plotting graphs, or outputting results in APA format.

➢ One user-defined function for efficiently subsetting data frames is provided here.

Manuscript Checklists. Up to this point, you've read published manuscripts, but soon you'll begin writing and preparing manuscripts yourself. Doing so involves many steps besides writing the main text, and these include producing tables and figures, assembling supplemental materials, and applying APA format. One way to make this process more efficient is to build a checklist for preparing, and then error checking, your materials before you submit.

➢ Several sets of manuscript checklists are here.

Manuscript Revisions Template. After submitting your manuscript to a journal, the editor may sometimes reply with a "revise-and-resubmit", meaning that your manuscript will not be published in its current form but would be reconsidered by the same journal after you make a set of revisions. A revise-and-resubmit almost always requires rewriting parts of your manuscript and sometimes requires collecting additional data. After you receive reviews, one way to organize possible next steps is to collect, and then annotate, these reviewer comments within one document. The document can then be saved and edited by each collaborator.

➢ Two example templates are provided [here](#).

Response Letter Template. After receiving a revise-and-resubmit, you will be expected to revise your manuscript as well as draft a response letter that replies point-by-point to each of the editor's and reviewers' comments. One way to write the response letter efficiently is to work from a template. Consider writing the review team's comments into the template as soon as you receive the revise-and-resubmit, then update the letter continuously as you revise.

➢ One example template is provided [here](#).

Other Systems for Analyzing, Writing Up, and Presenting Data.

- *APA-Style Manuscript Template*. APA formatting guidelines are extensive. Consider working from a template that builds in common features of APA style (see [here](#)).
- *Cover Letter Template*. Request example cover letters from your advisors and use these cover letters as templates when you submit manuscripts.
- *Questions Log*. After presenting in conferences or lab meetings, log difficult questions and write out effective answers. Review your questions log before presenting again.
- *PowerPoint Template*. Consider building a PowerPoint template to standardize themes, transitions, font styles, and common slides like title slides and collaborator slides.
- *HLM 7*. This software provides a straightforward interface for modeling multilevel and longitudinal data (see [here](#)).
- *JASP*. This software performs Bayesian data analyses in addition to many of the frequentist analyses that you would perform in R, Stata, or SPSS. See [here](#).
- *Single-Paper Meta-Analysis*. Meta-analyze your data across multiple experiments using the Single-Paper Meta-Analysis app [here](#).
- *Analyses Log*. In research collaborations with multiple data analysts, consider building a spreadsheet to track which collaborators performed which data analyses.
- *Scrivener*. Consider logging notes and relevant citations, and later outlining the structure of your paper, in Scrivener before moving to traditional Word processing (see [here](#)).
- *VBA Macros*. Consider writing macros to automatically italicize statistics, add Greek letters, and incorporate subscripts and superscripts in your manuscripts.

Supplementary Systems for Collecting and Managing References

Text Recognition Software. Many articles that you access on the web will be scanned as images, and as a result, contain text that is not searchable. Text recognition software converts scanned images to searchable text to make reading and retrieval more efficient. Consider making use of built-in text recognition software within Google Drive or OneNote, or download stand-alone alternatives such as ABBYY Finereader or Simple OCR.

➢ ABBYY Finereader is [here](#); Simple OCR is [here](#).

RSS Feed Readers. RSS feed readers allow you to stay on top of content from academic journals, blogs, and other sources within one application. Create an account, choose your RSS feeds, and later check your RSS reader to browse new content.

➢ RSS feed readers are [here](#).

Other Systems for Collecting and Managing References.
- *Calibre*. This e-book management tool allows you to store, organize, edit, and convert e-books such as handbooks (see here).
- *References Database*. If you need to sort articles by substantive criteria not stored in meta-data, consider populating and filtering your own references database in Excel.

Supplementary Systems for Managing Research, Coursework, and the PhD

Project Results Template. Some projects will require running only a small number of studies before you begin preparing the manuscript. But others—especially those in which you recruit participants through online subject pools—may prompt you to run a dozen or more studies before you begin writing. One way to manage projects with a large number of studies is to assemble a project results document that summarizes methods and results within one file.
➢ One template is attached here.

PhD Requirements Log. At the start of the PhD, you will likely receive an abundance of information about dissertation areas, course offerings, and other program requirements. One way to distill this information is to extract the requirements that correspond to your own track within the program and then record them in a separate file apart from the more extensive materials you received from program coordinators. Doing so could help you monitor which requirements you've completed, which ones remain, and how best to fulfill them.

Other Systems for Managing Research, Coursework, and the PhD.
- *Projects Log*. Consider tracking your current projects, as well as ongoing lab studies and active study materials, within one central spreadsheet (see examples here).
- *MTurk Transactions Log*. If you launch studies for several advisors through one MTurk account, consider tracking deposits and expenditures (see one example here).
- *Ideas Log*. You will pitch ideas to your faculty advisors, and one way to facilitate this process is to develop an "ideas" log to record your insights within one file.
- *Study Materials Folder*. Consider nesting your templates within a study materials folder. To implement a new study, simply copy this folder to a new location on your computer.
- *Weekly Checklists*. Consider developing weekly checklists for common tasks like sending lab updates, creating RA schedules, and retrieving study materials.
- *Reimbursements Log*. Consider building a log to track research as well as conference-related expenses. You can refer to this log later while seeking reimbursement.
- *Gmail Filters*. To help manage email, consider filtering messages from social media and other non-academic senders out of your primary inbox and into separate folders.
- *Maintenance Log*. If you implement many systems, consider building a maintenance log to record bugs and omissions. Then repair your systems weekly or monthly.

ADDITIONAL RESOURCES

Additional Resources for Designing and Implementing Studies

Pre-Registration Services. A growing number of psychologists are pre-registering their research studies—that is, they are uploading information about study design and analysis plans to the web before they launch. If you or your advisors expect to pre-register your studies, consider browsing pre-registration services as well as their pre-registration forms. Two common services are the Open Science Framework (OSF) and AsPredicted.

➢ The Open Science Framework is here; AsPredicted is here.

ChatPlat. Many studies in psychology require participants to interact with one another in the lab or in the field. On occasion, however, hypotheses about social interaction can also be tested by asking people to interact online. ChatPlat embeds a chat window within your Qualtrics survey and then allows lab or online participants to interact with one another through written messaging. Then ChatPlat outputs their conversations in spreadsheets separate from your Qualtrics data sheet.

➢ ChatPlat is here.

Evaer Video Recorder. In some lab studies, pairs of participants may interact with one another over Skype from separate rooms or study locations. You may later wish to transcribe the audio for text analysis or use the video in follow-up studies with observers. To ensure that you gain access to these recordings, consider installing the Evaer video recorder. Evaer records video and audio during live Skype calls and saves them locally to your computer.

➢ Evaer is here.

Additional Resources for Analyzing, Writing Up, and Presenting Data

Advice from Our Elders. You will receive extensive wisdom from faculty through research collaborations, lab meetings and departmental talks. But at times, faculty from our own and other universities go the extra mile to impart their wisdom to a broader audience through helpful presentations and publications. Peruse these resources for insights that you can apply to your own work.

➢ Advice for posters is here; talks here; empirical papers here; review papers here.

Other Resources for Analyzing, Writing Up, and Presenting Data.
- *Statistical Software Blogs and Tutorials.* Online blogs and tutorials discuss statistical packages at length. Tutorials for R can be found here; Stata here; SPSS here.
- *Stack Exchange.* The Stack Exchange Q&A communities provide excellent input to help resolve your statistical and programming difficulties (here).
- *Statcheck.* This software extracts statistics and p-values from your manuscript and checks them for errors. Consider using Statcheck (here) before you submit.
- *APA Style Guides.* The APA Style Blog (here) and the Purdue Online Writing Lab (here) provide thorough overviews of APA style.
- *LIWC.* Perform text analysis using James Pennebaker's LIWC software to better understand your participants' thoughts and feelings from their writing or speech (here).

- *OSF for Meetings*. After major conferences, the Open Science Framework allows authors to upload their posters and talks publicly to the web ([here](#)).
- *Hammer Tool*. Within PowerPoint, this tool memorizes the size and position of any graph that you specify, then resizes and repositions other graphs to match it (see [here](#)).

Additional Resources for Collecting and Managing References

Literature Search Tools. You will conduct literature searches when developing research ideas, writing manuscripts, and exploring new content areas. A number of search tools exist to help you uncover important empirical articles, review articles, and handbook chapters.
- ➢ Article search tools [here](#); handbook search tools [here](#).

Other Resources for Collecting and Managing References.
- *Google Scholar Alerts*. Consider following the Google Scholar profiles of your favorite academics. Custom alerts can be enabled [here](#) using the syntax described [here](#).
- *Table of Contents Alerts*. Many journals offer Table of Contents alerts, which send the titles and authors of new publications straight to your inbox.

Additional Resources for Managing Research, Coursework, and the PhD

Related Guides. One faculty member at UC Berkeley kindly assembled a related guide during her PhD, and the guide presents information about conferences and journals beyond the scope of information provided here. Browse this guide for further insights about managing research, coursework, and the PhD.
- ➢ See [here](#). Contact: Juliana Schroeder (jschroeder@berkeley.edu)

Boomerang for Gmail. You will send research-related emails to collaborators, research assistants and program coordinators, and given the volume of emails you send, it may be difficult to keep track of who has replied to your emails and who has not. Boomerang makes this easy by sending alerts to your inbox when the recipient of your email has not replied within 24 hours, 48 hours, or any period of time that you specify.
- ➢ Boomerang can be downloaded [here](#).

Other Resources for Managing Research, Coursework, and the PhD.
- *Task Management Software*. Structure your time and your priorities from day to day using task management software ([here](#)).
- *Project Management Software*. Set short- and long-term milestones for your ongoing projects by using project management software ([here](#)).
- *Mind-Mapping Software*. Record your ongoing projects and research ideas and then visualize the connections between them with mind-mapping software (examples [here](#)).
- *Calendar Apps.* Record the time and location of classes, meetings, and departmental talks using a digital calendar (see [here](#)).
- *Time-Tracking Apps*. Track how you allocate your time across projects and collaborations using time-tracking apps (see [here](#)).

- *SPSP Shared-Interest Groups*. Join shared-interest groups through SPSP and then consider subscribing to receive email notifications here.
- *Online Tax Payments*. Only two things in life are certain. Schedule your quarterly tax payments online through EFTPS (federal: here) and Official Payments (state: here).