

Language Learning Lab Manual

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<http://l3atbc.org/L3Manual.pdf>

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1 Acknowledgements

This manual is based heavily on the fantastic Peelle Lab manual <http://peellelab.org>. Important ideas were provided (in no particular order) by Amanda Pogue, Jesse Snedeker, Michael Ullman, Melissa Kline, Elizabeth Kensinger, Sara Cordes, and many others.

2 Introduction

My goal is to foster an environment of consistent scientific excellence and personal development that supports every lab member in reaching their full potential, and helps us have fun while doing great science. I want you to be happy and productive while you are here. This manual is a first point of reference for current lab members as we strive to achieve these goals, and serves as a general introduction for prospective members. You can also find the lab elsewhere:

- Lab website: <http://l3atbc.org>
- Web Laboratory: <http://gameswithwords.org>
- Facebook¹: <http://facebook.com/GamesWithWords>
- Twitter: <http://twitter.com/gameswithwords>

There are also a couple of sites accessible only by lab members:

- Lab wiki: <http://wikis.l3atbc.org/labwiki/>
- Basecamp: <https://3.basecamp.com/3340659>

In general, firm policies are in the lab manual, whereas ways of implementing these policies (i.e., getting stuff done) are on the wiki so that they can be updated by anyone in the lab. Basecamp organizes tasks that need to be done (and relevant discussions) for specific projects, rather than general principles – which are in the lab manual – or instructions on how to do repeated tasks – which should go in the wiki. Any information that is potentially private should go in a protected location. (You can read more about various lab resources in §7.1 on page 17.)

The L^AT_EX source for the lab manual will eventually be available on Bitbucket.

¹What, you haven't "liked" our page yet?

I assume the lab manual and wiki are accurate. This means that you should follow all of the policies and protocols contained in the manual and wiki. If you notice something that seems to be wrong, please let me know (for the lab manual) or change it yourself (for the wiki). If there is something in the lab manual or wiki that you notice people aren't doing, please bring this up at lab meeting, or to me, privately—don't assume this is okay (it's not).

3 Lab Motto: Rigor. Community. Diversity of Thought.

It's better to work smarter than harder (or, better yet, work smart *and* hard). Which raises a question: What makes for a good scientist? I've been asking myself (and others!) this question for over a decade, and I've distilled what I've learned into our lab motto, "Rigor. Community. Diversity of Thought." These phrases, which I explain below, are strictly ordered, with *rigor* trumping *community* which trumps diversity of thought.

I find this motto extremely useful when making decisions and trading off alternatives. I hope you find it as useful and compelling as I do (if you want to suggest an alternative, let's discuss!). But at the very least, they should help you understand my priorities (pro tip: I use these principles when budgeting my time and lab funds!). I hope you will see these principles and priorities reflected throughout this manual. Please discuss with me if you feel that any policies are inconsistent with these priorities, or if there are additional policies we should consider.

3.1 Rigor

A restaurant that does not serve food is not a restaurant. A school without students is not a school. And a lab that doesn't produce science is not a lab. We are in this for the science, and all other considerations secondary. As people, we may have other interests and agendas that are more important, but the *lab* does not. If we don't have the resources or the expertise to do a study right, we should either find those resources and expertise or find something else to study. Note that this includes not just methodological rigor but conceptual rigor: We aren't in this to produce methodologically impeccable investigations of uninteresting questions.

Notice that among the things this principle does not include are publication, awards, prestige, or even credit. Obviously, it's satisfying (and useful!) to get credit for our contributions, but it is the contribution that is primary.

3.2 Community

Science is a community endeavor. We all depend on each other: for ideas, for data, for support. This is obviously true within a lab, but it extends to our department, our university, and the scientific community at large. Be generous in our contributions to that community. Pay back other's help. If you can't pay it back, pay it forward. It is very possible to make your greatest contribution to science through your students and colleagues rather than directly through your own work.

Supporting the academic community is not a purely altruistic endeavor. Every department talk you attend is not just an opportunity to support the community but to learn something unexpected. Any time you discuss research with a colleague or labmate is a chance they will provide you with some crucial missing insight. There are a lot of smart people out there. Not only do we not need to do everything ourselves, but trying to is inconsistent with doing the best science we can do.

3.3 Diversity of Thought

You cannot know everything. You cannot be good at everything. I'm sorry to be the bearer of bad news. The good news is that the world is full of people who have knowledge and abilities that are complementary to yours. I have done all my best work by collaborating with people who have differing views and different backgrounds. This includes working with people who were trained in different traditions or even different fields, working with people who have technical skills that I lack, and people who have different life experiences. This is hardly surprising. But working with people different from ourselves is difficult, not just because it requires patience (nobody likes someone disagreeing with them) but also because it may require building a shared vocabulary. It is my belief – and therefore the policy of this lab – that this effort is worthwhile.

4 General

4.1 Funding

Our main source of funding is a generous start-up grant from Boston College. This covers salary for personnel, equipment, subject payment, and so on. This means that much of our work is paid for by alumni donations and student tuition. We also have a mid-sized grant from the National Science Foundation (i.e., from tax-payers), which covers work specific to the VerbCorner project. We also have a small grant from the American Psychological Foundation (a charitable foundation), which is covering a pilot summer internship program for high schoolers. It is important that we respect these investments and that we run the lab in a way that shows we use our research funding wisely.

4.2 Local Collaborators

- [Ellen Winner](#) (Psychology) directs the Arts and Mind lab and is the chair of our department. We are collaborating with Ellen on a study concerning the role of critical periods in musical development.

4.3 (Some) Other Collaborators

- [David Barner](#) (UCSD) studies language acquisition. We are collaborating on the study of number acquisition in early childhood.
- [Laura Germine](#) (MGH) is the founder of [testmybrain.org](#) and the director of the Many Brains Project, and is one of the real pioneers of Internet-based research. We don't have any joint projects at the moment, but I expect that is only a matter of time.
- [Tobias Gerstenberg](#) (MIT) studies causality and responsibility attribution, using experiments and computational models. He is a collaborator on much of the Winograd Schema work.
- [Noah Goodman](#) (Stanford) is a computational modeler who works at the intersection of language and thought. We collaborate on Winograd Schema work.

- [Yi Ting Huang](#) (University of Maryland) studies language development, and was a lab-mate in graduate school. Yi Ting is collaborating on work on scalar implicature.
- [Timothy O'Donnell](#) (McGill) studies [productivity and reuse](#) in language. Tim was my labmate in both graduate school and during my post-doc. He is a key contributor to most of the computational modeling in the lab.
- [Steven Pinker](#) (Harvard) studies the role of evolution in constraining thought, language, and other aspects of cognition. He is a collaborator on work on the relationship between social cognition and pragmatics, as well as critical periods in language.
- [Jesse Snedeker](#) (Harvard University) was my PhD advisor and remains a source of inspiration and guidance. We are writing up several old projects and continuing to collaborate on theoretical work. Jesse's lab organizes the Boston-area Language and Cognition seminar series, which you can read about in [page 15](#).
- [Joshua Tenenbaum](#) (MIT) is a computational modeler focused on intuitive theories and their role in development and thought. He was my post-doctoral advisor and is a major influence on all work in the lab. We are collaborating on a number of projects.

5 Being in the lab

5.1 Everyone

Big picture

We are a team, and each of us depends on others for our success. As such, we expect each other to:

- Push the envelope of scientific discovery and personal excellence.
- Double-check our work, and be at least a little obsessive.
- Be supportive—we're all in this together.
- Be independent when possible, ask for help when necessary.
- Communicate honestly, even when it's difficult.
- Mentor those more junior.
- Work towards proficiency in Unix, L^AT_EX, Python, and R.
- Be patient, including with your PI. He will forget things you just talked about, and repeat some stories over and over. That's the breaks.
- Advocate for our own needs, including personal and career goals.
- Respect each other's strengths, weaknesses, differences, and beliefs.
- **Keep everything awesome.**

Small picture

We're sharing a relatively small space, so please be thoughtful of others, including (but not limited to):

- With few exceptions, **do not come to the lab if you are sick**. It's better to keep everyone healthy. If you are sick, work from home. Or, alternatively, take the day off, get better, and adjust the hours in your calendar. Either way, email the lab manager or me to let us know. If

you are supposed to be testing a subject, make sure someone will be able to take your place.

- Do not leave food, drinks, or crumbs out in the lab.
- Wash dishes immediately. Do not leave them in the sink.
- Lock the door if there is no one in the lab, even if you will only be gone “a minute”.
- Keep the lab neat—especially in the phone area. Items left unattended may be cleaned, reclaimed, or recycled.

All the above goes doubly since we share our space with Katie McAuliffe’s lab. We want to be the Fantastic Roommate of Perpetual Awesomeness, not the Slob of Nightmares.

Performance Reviews

Everyone (including me) is here to learn and improve. That requires feedback. You should expect to get performance reviews at the end of each term you are in the lab (including the summer), or perhaps more often. These reviews will focus on what you are doing well, and where you would get the most bang for your buck in terms of improvement. Remember that everyone (including me) could stand to improve at some things, so treat this as an opportunity for collaborating on producing your best self.

These reviews will be conducted by myself in conjunction with your immediate supervisor(s), if that isn’t me.

5.2 Full-Time Lab Members

5.3 The Boss

You can expect me to:

- Have a vision of where the lab is going.
- Care about your happiness.

- Obtain the funding to support the science and the people in the lab.
- Support you in your career development – **regardless of whether you plan to stay in research** – including writing letters of recommendation, introductions to other scientists, subsidizing conference travel, and promoting your work as often as possible.
- Support you in your personal growth and encourage you to do things other than science.
- Treat you to coffee.
- Make the time to meet with you regularly, read through your manuscripts, and talk about science.

Postdocs

I expect postdocs to move towards being more PI-like, including giving talks, writing grants, and cultivating an independent research program (while still supporting the lab’s research).

PhD students

I expect PhD students to:

- Know the literature related to their topic like the back of their hand.
- Seek out and apply for fellowships and awards (including travel awards, etc.).
- Realize there are times for pulling all nighters, and times for leaving early to go to the park and enjoy the sunshine.

By the time you’re done, you will have a strong grasp of statistics, be able to use R and/or Python for data analysis and plotting, and write papers in \LaTeX . The learning curve can be a little steep on these, but it’s well worth it.

Coordinators and Managers

I expect paid employees – and everyone else! – to use their time efficiently to support the projects to which they are assigned. Paid employees will typically have the most interaction with other staff and with research participants, and in these contexts especially should be a model of professionalism.

It is the responsibility of the coordinators and managers to ensure that the lab is open and staffed between 9:00 am and 5:00 pm, except during university holidays or during conferences. More senior members of the lab (including me) will often have other places they need to be. Part of your job is to be the point person for subjects and undergraduates.

5.4 Undergraduate students

Undergraduates are a vital part of the team. I expect undergraduates to be utterly reliable and willing to help with whatever projects need it. At a bare minimum, reliability includes showing up on time, maintaining your hours on the lab calendar, and making sure that all of your work is accurate (double-check everything). If you cannot be in the lab during your regular hours, check in with your direct supervisor ahead of time.

Because we only accept responsible, reliable undergraduates into the lab, I will assume that if you do not show up for your scheduled hours, it is because you have fallen into an unmarked well or have been paralyzed by a freak eel attack, and a rescue party will be sent forth.

If you find yourself without a specific project:

- Ask around to see if you can help with anything.
- Look on the wiki under and spend some time learning something new.
- Look on Basecamp for either a wiki page that needs creating/updating, or other miscellaneous lab tasks that need to be done.

There is enough to do that you should not be bored!

If you are working directly with me, we will meet regularly. If you are working with another senior member of the lab, you will be meeting with them regularly. The lab has grown large enough that I don't have regularly-scheduled one-on-ones with all the undergraduates. However, you

can always book a meeting with me (see the wiki for details). In addition, you should expect to see me at lab meetings, lab coffee hours, and other lab activities. While there are procedures in place to ensure that you get guidance from senior members of the lab, if you feel like you need more supervision, it is your responsibility to advocate for your needs.

Academic Year

Except for unusual circumstances, undergraduates should expect to spend a minimum of 10 hours per week in the lab. For students receiving course credit, this will be closer to 15. Thesis students should be putting in around 20. If you are receiving course credit or doing a thesis, you will also do a final presentation at the end of the semester, describing your work.

Your first semester in the lab is an opportunity to see whether continuing in the lab is a good fit; towards the end of your first semester, you and your direct supervisor will meet to discuss whether you will continue.

Summer Interns

The summer is a great time to delve into research. You will likely get as much research done during the summer as during the entire school year. Except under special circumstances, summer students are expected to work for at least 40 hours per week for at least 8 weeks, preferably 10. Depending on schedule, summer students will typically present their work to the department at the end of the summer.

Deputy Lab Manager

During terms when we are testing subjects on-site in the lab, several RAs will be designated *deputy lab managers*. These will typically be RAs who have spent at least a semester in the lab already and have excelled at their work.

Deputy lab managers are charged with ensuring that testing runs smoothly. Our work depends on the enthusiastic cooperation of our subjects, whether undergraduates, families, or older adults. **Every member of the lab should do their utmost to ensure that subjects find their experience enjoyable and rewarding and feel that their time and effort is being respected.** Thus, it should *never* be the case that

- Subjects show up but not experimenter is waiting for them.
- Subjects show up but the experimenters are not ready.
- The waiting room is in disarray.
- The toys are filthy.
- There are no toys/crayons/paper/etc. for children.
- Sib-sitters are needed but none are available.
- Etc.

If everybody does their job, no such issues will ever arise. The Deputy Lab Manager serves as the lab's backup. It is his/her job to identify and address any gaps that appear. If you can resolve the situation by yourself, do so. If this problem requires the involvement of a senior lab member, find one. If there are systematic issues that should be addressed, loop me or a lab coordinator in.

The Deputy Lab Manager also assists the lab coordinators in training new RAs, answering their questions, and helping them get acclimated to the laboratory.

The Deputy Lab Manager should also answer the lab phone, check voice messages, monitor the lab email, handle alumni relations, and manage the lab website.

5.5 University policies

Sexual harassment

Every member of the lab is entitled to a safe environment, free from harassment. I urge anyone who witnesses or is affected by behavior not meeting these norms – including but not restricted to sexual harassment – to inform me so that I can take appropriate action to rectify the situation.

Note that university policy requires that if any faculty member (such as me) becomes aware of any sexual harassment or abuse involving students or employees we are obligated to report it to the Title IX Sexual Harassment Response Coordinator. If feelyou need to discuss these issues in confidence, please see a counselor or other medical professional on campus who can

discuss these issues in their professional capacity while maintaining confidentiality.

6 Community of Scholars

We work better when we work together. As members of the lab, you are expected to participate in the community of scholars. This certainly includes supporting other members of the community – attending their talks, discussing their ideas with them, and helping out around the lab (e.g., 8.1). You also owe it to yourself to take advantage of your good fortune to be surrounded by brilliant scholars in the lab, at the university, and in Boston more broadly (uncontroversially the Center of the Academic Universe).

6.1 Lab Meetings

Lab members participate in both regular and ad hoc meetings. These meetings may involve everyone or just subgroups. If you have been asked to participate in a meeting, it is because you are a vital part of that project group. If you cannot attend, you should tell the group leader in advance. Remember, however, that the group may no longer be able to carry out the intended work without your presence, so skip meetings sparingly.

If you do not appear at a meeting as expected and have not informed anyone in advance, it will be assumed that you have been abducted by aliens, and a search-and-rescue mission will be organized.

All meetings begin and end on time, if not earlier. Don't be afraid to remind me of this if I am the offending party. It is important that we all respect each other's time.

6.2 Colloquia

The university hosts a number of colloquia and ad hoc talks. While these are probably too advanced for new members of the lab, thesis students and more senior members of the lab are encouraged to attend talks that are of interest. If a talk conflicts with a meeting, discuss with the meeting organizer the possibility of moving the time of the meeting, particularly if the talk would be of interest to multiple lab members. (If the meeting cannot be moved, you should attend the meeting except under exceptional circumstances.)

All senior members should be sure to attend:

- The Department Colloquium
- The Developmental Workshop
- Language and Cognition (hosted at Harvard)
- The graduate student and undergrad research days

When possible, senior members should try to attend dissertation defenses in our department. This is a good way of learning about work outside of our immediate area. **Everyone** should try to attend when one of our own is defending a thesis.

6.3 Conferences

I believe in conferences – both presenting at conference and attending them even when not presenting. Senior lab members have a conference budget, which they can use to support their own travel to conferences. This money can be used even if you are not presenting work at that conference. Some projects additionally have funds to support presenting at a conference. To use those funds, you will need the permission of whoever manages the budget for that project (possibly you!).

The reason for giving senior lab members a conference budget is so that they can decide for themselves what conferences make the most sense, as well as how much comfort they need when traveling (though keep in mind Federal reimbursement rules). When allowed by the business office, you should feel free to use *per diem*. The purpose is to provide you with maximum flexibility. I will of course advise you on which conferences I think might be appropriate. Most years, I attend the Boston University Conference on Language Development, which takes place around Halloween; the Annual Meeting of the Cognitive Science Society, which takes place in late July or early August, and; either Architectures and Mechanisms in Language Processing (early September somewhere in Europe) or the CUNY Human Sentence Processing Conference (in March, somewhere in the USA).

Depending on funding, the lab may pay for registration at BUCLD for advanced undergraduates, particularly undergraduates who are considering graduate school. In rare circumstances, the lab may support attendance at out-of-town conferences for thesis students.

7 Communication

7.1 Communication within the lab

I am usually busier than I'd like to be, and as a result have less time for talking to folks than I'd like. However, **you (lab members) are one of the most important parts of my job**, and I need your help to stay organized and involved in the things I need to be involved in. Three general rules of thumb are:

1. Be proactive—tell me what you need. This includes coming to knock on my door even if it seems like you are interrupting, booking appointments with me (see the wiki for details). In all likelihood, I will not check in with you as often as I'd like, so it is up to you to make sure nothing falls through the cracks.
2. Write things down and remind me what we've talked about. Remember that that I work on an order of magnitude more projects than you, with an order of magnitude more people. Please take pity on me and help me keep things straight. Don't hesitate to bring me up to speed when we meet. Even if I already remember what we are talking about, a couple of introductory topic sentences will help get me in the right frame of mind. Be sure to write down everything in your lab notebook and Basecamp!
3. Read all of the lab documentation: this lab manual, the lab wiki, and Basecamp. You are responsible for knowing what is in each of these places, following the rules and guidelines we have set up, and notifying someone if you find incorrect information (or if you have questions). Putting it another way, I only have so much time I can give you. Do you want me to use it up telling you how to set up your printer or where things get filed?

Basecamp

Basecamp is the official record of what we talked about: If it's not in Basecamp it didn't happen. So, please help me by keeping Basecamp up to date. A few thoughts and tips:

- Notes from meetings should go into a discussion in the appropriate basecamp. For group meetings, someone should be designated the note-taker. If the meeting is just between you and me, you are the note-taker. You may take notes during the meeting on your laptop or on paper in order to later transfer to Basecamp.
- Use the to-do lists, both for yourself and others (including me). It helps me see what is coming up and what things you are thinking about. Take the time to assign the task to someone when possible and appropriate (including yourself, or me).
- When you post a message, you can optionally have it emailed to people on the project. One of the nice things about Basecamp is that in theory it can reduce the amount of email we have to read. If you need a response, or if it's critical I know what you've added, then by all means have Basecamp email me. But if you are just taking notes or updating an ongoing discussion, uncheck the box and it will save me a few minutes.
- You will get regular check-in messages associated with the various basecamps you are part of. Be sure to respond to these, as they are used to determine meeting agendas and make everything run more smoothly.

Wiki

The lab wiki is our shared collection of knowledge about how to get things done in the lab. The lab manual you are reading now is “top down”, in that I am writing the whole thing myself. By contrast the wiki is a shared resource to which everyone can—and should—contribute. A good rule of thumb is that if you need to figure out how to do something, someone else in the lab may someday need to do the same thing. Whenever possible, please document what you figure out on the wiki, including updating old sections which may no longer be relevant. Please encourage each other (and those working with you) to do the same!

Email

Email is one of the greatest of modern inventions. It is also a scourge threatening to obliterate all sentient life. Before writing an email, consider whether email is the best method of communicating this issue. Some things will be faster to discuss in person – either in an impromptu conversation (for urgent issues) or at a regular meeting (for instance, you might wait to discuss something with me at our next one-on-one). If the email is about a specific project, it may be better to use Basecamp.

I will do my best to respond to your emails as soon as I can. Email from the lab is some of my favorite email! Unfortunately, some days I am in meetings back-to-back and am unable to read email. If something is urgent, follow up as needed (in person or by email).

Similarly, I expect that you will read all email sent to you and respond (if a response is needed) as soon as possible. Unless you, too, are in back-to-back meetings all day, this should be within one business day. [One “business day” because I encourage you to occasionally take a break from email on evenings and weekends, and will (sometimes) do the same myself.] If you are in that many meetings as a student, we should probably discuss your schedule!

Calendars

Accurate calendars are extremely important in managing lab space and resources. It is crucial that everyone use the calendars regularly and ensure they are accurate. **Use the lab calendars and follow the instructions described on the wiki.**

7.2 Communication outside the lab

Communicating with people outside the lab is extremely important: your actions reflect not only on yourself, but on the lab, the lab director, the department, and the university. This is true both for participants (who volunteer for our studies) and scientific colleagues (whose opinions have a direct impact on our success and opportunity—they are the ones reviewing our grants and papers!). It is important that every time one of us represents the lab, it is to a high level of quality. The less experience you have, the more preparation is required. Don’t skimp!

Phone

Answering phone calls the laboratory is the job of the lab manager(s) and any undergraduates so designated. If none of them are present but you are, please answer it. Identify the lab and your name. Most calls will be from potential (or current) research participants, so it's important they view us as professional and competent. “Language Learning Lab. This is [your name here]. How may I help you?” is a great start.

The lab manager(s) and designated undergraduates should check voice-mail messages daily to make sure nothing important slips through.

If someone calls the lab and leaves a message, call them back within one business day to confirm that we received the call. If they would like to participate in a study but we can't schedule them, thank them for their interest and ask if we can contact them in the future should one come up (if you actually will). If you are not going to contact them (or they do not qualify), tell them that we are done recruiting for that study and do not have anything else available, but thank them for their interest. Refer to §8.2 (page 26) and the lab wiki for detailed instructions on scheduling participants and general phone etiquette.

Manuscripts

When you are out in the big world on your own, you are free to format your manuscripts however you like. While you're in L3, when sending me a draft of a manuscript, please do the following:

- Use \LaTeX if at all possible (as of writing, the lab is considering R Markdown as an addition/alternative). \LaTeX is not that hard to learn. Many – though not all – of our collaborators are comfortable with \LaTeX . If they are not, please discuss with me.
- Store the manuscript in a repo. Do not email papers around; share the repo instead. (Again, if your co-author refuses to use Git, discuss with me.)
- Include page numbers.
- Include the full author list starting from the first draft. This helps clarify any authorship issues or concerns early on.

- Include placeholders for all sections (i.e., introduction, methods, results, discussion, etc.) even if they are empty, so that we can fill them in as we go. Having placeholders also helps clarify the organization from the beginning.

Some of these are good practice; others are simply my own preferences. However, if you humor me in these, it will decrease my distraction when reading your writing, and ultimately enable me to be more useful. I'm happy to send you a blank draft manuscript to get you started.

7.3 Conference submissions

If it has my name on it, I want to see a draft **at least one week** before the submission deadline. I can't read 15 6-page papers all the night before! Plus, I've found that having the time to do several rounds of revision increases the probability of acceptance.

Talks

An old saying goes: *You only have one chance to make a first impression.* Another, more science-specific one, is: *Every job is a job talk.* This isn't a saying but probably should be: *Fantastic research that nobody understands isn't fantastic.* In short, approach giving talks as a serious endeavor that is at least as important as any other part of the research cycle.

As such, anyone giving a talk to a non-lab audience ought to give practice talk at least one week before the real talk. *This includes me.* If this is your first public talk on a lab project – or an exceptionally important talk – plan on at least two practice talks (starting at least 2 weeks before the real talk). This also means that when planning your time, you should factor in time to attend your labmates' practice talks. You may find you learn more from helping your labmates improve their talks than you learn from practicing your own.

Practice talks should be mostly finished (final slides, practiced, and the right length) so that our comments will be as helpful as possible. Schedule one or more meetings with me ahead of time to plan or go over your slides, especially if you haven't given many talks before.

Posters

Posters are talks, too. People have gotten job offers at posters before. You should circulate an initial version of your poster to all co-authors. Remember that they may be working on their own posters or presentations, so the more time you give them, the more likely you'll get a detailed response. I suggest at least one week of lead time.

Make sure to double check the poster size and orientation for the conference, and the size of the paper or canvas it will be printed on. I speak from experience.

Posters should be available in PDF version on the lab website *no later* than the day of your talk. This way, you can include the URL on your poster.

For many conferences, you will want to bring a sign-up sheet where people can request an emailed PDF (some people will prefer this to writing down a URL). Pro tip: I only get emails for about one in ten of the posters I sign up for, which suggests that most people lose these lists. Try to be more organized, but assume that you probably won't be, and send the email out the same day.

8 Science

8.1 Open, accurate, and reproducible science

All science builds on prior work. If that prior work turns out to be in error, time and money is wasted and careers are ruined. You have a responsibility to the community – and a responsibility to me and your labmates – to always uphold the highest standards of scientific accuracy and integrity. As such, you should always:

- make all reasonable efforts to avoid errors appearing in our published work, and
- swiftly correct any errors that are detected.

Everything in the rest of this section is elaboration on those overarching ideals.

Fabrication

By being in the lab you agree to adhere to professional ethical standards. There is never an excuse for fabricating or misrepresenting data. If you have any questions, or in the unlikely event that you have concerns about something in the lab, please talk to me immediately.

Adverse Events

A key part of accuracy is anticipating and avoiding “adverse events” (including near misses), and creating structures in the lab that facilitate a high level of reliability.

Inspired by a blog post on reliability in the lab¹, I ask you to report any adverse events through Basecamp so that they can be discussed during the next lab meeting. There should be a message thread for this in the L3atBC basecamp; if not, please start one.

¹<http://jeffrouder.blogspot.com/2015/03/is-your-lab-highly-reliable.html>

- Any of the lab computers malfunctioning (including freezing or crashing)
- Not being able to find the installation disc for a software program
- Nearly running out of money to pay participants (this counts as a “near miss” which we also need to discuss)

As a lab member it is your responsibility to be aware of times when things don't go as planned and to bring these to the attention of the rest of the group. Even better, let's all work together to find ways of preventing such occurrences in the future.

Documenting Your Work

Every study and paper should be deposited in a git repository on Bitbucket. This repository should have an up-to-date `readme.md` in order to facilitate searching (we have a lot of repositories). You should commit regularly, with clear, concise commit messages.

Every study should have a folder *Latex* with a file *ProjectNarrative.tex*. This is the electronic equivalent of the lab notebooks that people in bench sciences use. You should be pasting in graphs, analysis notes, or even code, preferably with a link to any relevant commit. A good Project Narrative can easily be more than 100 pages. Many researchers find it useful to have a section at the beginning that describes the methods and most important results so far. This can be useful for communicating with collaborators (like me).

The commit messages and Project Narrative should be sufficient such that were you to win the lottery and retire to the Bahamas, whoever took over your work could quickly and easily reconstruct what you have done. (More realistically, don't underestimate your own ability to forget what you did and how you did it.) For the same reason, the repo should be kept clean and orderly.

Pilot Experiments

I strongly encourage the use of pilot experiments. Pilot studies are experiments that are used to test out new stimuli or paradigms. Often, a project

will begin with several pilot studies, which are used to iteratively refine the methods.

Pilot studies should be in a folder named *Pilots* in the main folder of the study repo. If there are multiple pilots, each should have its own, self-contained folder.

As a general rule, pilot studies are not reported in publications, except perhaps in footnotes or appendices. Think of them as practice for the Main Event.

Main Experiments

Main experiments are experiments that are run with the intention of publishing them in a scientific work, whether or not they are ever actually published. Any experiment that you are considering publishing should meet the guidelines below.

Pre-Review

Nothing is worse than running an experiment – especially an expensive study – only to discover there was a bug in your code or problems with the stimuli. Before running any main experiment, you should write up the methods and planned analyses. This experiment plan – along with all stimuli – should be reviewed by another member of the lab *before you run any subjects*. Your reviewer may request changes, which you should make before running subjects.

Ideally, all researchers working on the project will review this plan, but your official reviewer should be someone not involved in the project (if any are available), so that s/he comes to it with a fresh perspective. This reviewer should be acknowledged in any publication stemming from that experiment.

It is up to you to find a reviewer. Every project and reviewer pair should be listed in chronological order in the lab wiki. This is to make sure that nobody in the lab is stuck doing all the reviewing. Spread the love.

All full-time members of the lab are required to be reviewers if asked. You should complete the review as quickly as you would like others to review for you. If it is going to take more than a week (i.e., you are about to leave on vacation or for a conference), you should decline the review. But don't do this too often. Nobody likes a freeloader.

If the documentation is confusing, messy, or incomplete, the reviewer should request that it be cleaned up prior to full review.

Registration

With few exceptions, study plans should be registered with the Open Science Framework after review and prior to running. More publications are starting to require this, and it takes all of a few minutes.

Pre-Submission Review

Just as we review experiments before they are run, we review them before they are sent out for publication. This should involve reviewing not only the manuscript but also the analysis scripts and the data themselves. Remember that we are not just checking for errors, we are also making sure that our documentation is clear and that other scientists can easily understand what we have done and reproduce it themselves. Again, this reviewer should be someone who was not involved in the project. It can be someone who reviewed (one of) the experiment(s).

8.2 Participants

Our research is made possible by the good will and generosity of our research participants. We not only need people to participate in our studies, but to try hard to do their best, and potentially return for a future study. Caring for our participants is one of the most important parts of the lab and something in which every member plays a role.

The most important thing is that participants must always be confident that we are professional and treating them with respect. All of the specific advice supports these goals. In general, it is helpful to model our interactions off of other professional situations, such as a doctor's office.

For all participants:

- **Dress appropriately:** The lab environment is fairly relaxed, and dress code is equally relaxed. However, everyone is expected to dress appropriately (i.e. avoiding revealing clothing and workout attire). If you have any questions about what constitutes appropriate clothing, please ask a lab manager.

Table 8.1: Terms associated with research studies

Instead of saying:	Say this:
experiment	study, research study
subject	volunteer, participant
test (e.g., “hearing test”)	task or screening (“hearing screening”)

- Answer the phone, and return all phone calls (and emails) promptly. Tell participants who you are, and where you are calling from: “Hello, this is [name] calling from the Language Learning Lab at Boston College. I am returning your call from yesterday regarding a research study.”
- Be prepared to answer questions. If you don’t know the answer, it is completely fine to ask the participant if someone else can call them back. You are then responsible for making sure this happens quickly.
- Arrive at least 30 minutes prior to testing time to make sure equipment and paperwork are all set, and to be around in the event the participant shows up early. Everything should be set up before the participant arrives. You should be at the designated meeting spot 15 minutes before the agreed upon time.

For non-students and parents:

- Always use a title (Dr./Ms./Mr.) and a participant’s last name when addressing them. If you aren’t sure how to pronounce their name, ask them.

We can also help participants feel more at ease by being thoughtful about the language we use. For example, participating in a “research study” is more friendly than being a “subject” in an “experiment”.

Some participants are involved in multiple studies, and they may lose track of which person is associated with which study. Make sure to remind participants you are calling or emailing that you are from L3, and clarify the location for testing when the time comes.

Refer to the lab wiki for specific information on recruiting, scheduling, and testing participants.

8.3 Testing locations

- Many of our testing locations are shared with other researchers, so it is very important that we are good citizens when it comes to using these spaces. Being a good citizen includes scheduling the time as required, not using more than our allotted time, and leaving the room as clean as we found it (or preferably cleaner).
- No one should test a subject without signing out the testing room.

See the lab wiki for specific instructions for various locations.

Backing up your files and data

Always assume that as soon as you turn your back the computer on which you have been working will explode. **Make sure your work is always backed up.** Thinking such dire thoughts will make it easier to remember to push all new data, paper drafts, etc., to the appropriate repo.

If you are an RA who has not yet learned how to use Git, use some other system for backing up.

8.4 Authorship

Many professional associations and journals have published authorship guidelines, which are worth looking at (for example: [ICMJE](#)). In my view there are two key requirements to being an author:

1. Contribute to the scientific content of the manuscript in a meaningful way.
2. Contribute to the writing of the manuscript in a meaningful way.

Note that “collect data”, “analyze data”, or “fund the study” aren’t on the list. Those are very important parts of a paper, but do not (on their own) warrant authorship. Being an author means understanding the content and being willing to take public responsibility for the work: a large part of this concerns the theoretical motivation and implications of the research. In practice, theoretical contributions are most often made through

helping with the study design, data interpretation, and discussion about a topic.

This doesn't mean that as an undergraduate or research assistant you can't be an author on a paper. Of course, if the study goes well and you are involved, you can be. However, you will need to know enough (or learn enough) about the subject to understand what we've done, and to contribute to the writing. I won't add you to a paper just because I like you and want to help you out; I *will* give you the opportunity to be involved to a degree that you can earn authorship, if you are willing to take on the challenge.

I assume that, unless we have talked about it, I will be an author on papers coming out of the lab. This does not mean that you should add me on to papers as a courtesy; it means that I expect you to offer me the opportunity to participate in the research in a way that merits authorship. Just as it may not make sense for you to be an author on certain papers, it may not make sense for me to be an author on some of yours, either because I am not needed or because you and I have decided it would be beneficial for you to take a stab at solo authorship. In other words, take the same approach with me that I take with you.

It is worth pointing out that there are many views regarding authorship, and within any view there are always borderline cases. When collaborating with other people, I tend to defer to their own lab culture. However, it's important that within our own lab, we are clear on the expectations for authorship and transparent about authorship discussions and decisions. If you ever have any questions, please come speak to me.

9 Other

9.1 Recommendation letters

It is part of my job (and, thankfully, quite often a pleasure) to write letters of recommendation for people in the lab. Please give me as much notice as possible, and make sure I know the deadline, format (electronic? printed?), official name of the organization, what you are applying for, and so on. Please also send along a current CV.

I will make extensive use of our one-on-one basecamp in order to refresh my memory. Remember, you may have only worked in a few labs, but I've worked with nearly 50 students, and over time, things blur together. This is a reason it's important for you to use basecamp faithfully.

If you are an undergraduate who worked primarily with me, I will write your letters on my own. If you worked primarily with a graduate student or post-doc, you should decide whether you want the letter to come from them or from me. If you want it to come from me, your direct supervisor should write a draft for me to edit.

For more senior lab members, please send me a draft of the letter (which I will modify). The first few times you do this it will probably feel awkward. However, keep in mind that your goal is to make it as easy as possible for a letter writer (in this case, me) to complete the task by the deadline and without error. Even if I re-word a lot of the letter—which I probably will—it will still have the name of what you are applying for, and hopefully some details regarding how long I have known you, the projects you have worked on, and so on. This is extremely helpful and will give me more time to focus on saying good things about you. Don't worry about being too "braggy"; I have no problem toning things down if need be.

Like everything else, communication is key, and when in doubt, ask!

10 Frequently asked questions

Where are all the FAQs?

No one has asked any questions yet.

If you are looking at a printed version, please write questions here:

11 Glossary

IRB (Institutional Review Board)

The IRB oversees human subjects research and makes sure that research is conducted in a way that protects subjects' safety and privacy. Our lab submits protocols to the IRB which describe the research we want to do; the approved protocol is linked to a particular consent form that subjects sign when they participate, informing them about the study.

PI (principal investigator)

In the context of a grant, the PI is the person responsible for making sure the proposed research gets done. More broadly it refers to a researcher who has their own research group or lab (i.e., someone who would be in a position to be a PI on a grant, regardless of whether or not they are currently funded).

CV (curriculum vitae)

Academics use CVs (literally "course of life") instead of resumes. A CV is a complete list of your academic work, including (at least) education, job history, papers published, presentations given, awards won, courses taught, grants received, and students mentored. Unlike a resume, there's no pressure for a CV to be short. There is no standard structure as to the order of information, other than that education and career history come first.

If you are looking at a printed version, please make a list of terms you'd like defined (feel free to include a suggested definition):

Reading test

Lab members: Please print out a copy of this page and write your name below to indicate you have read the current version of the manual and agree to follow these policies.

Date

Printed name

Signature