

A Guide to Writing a Senior Thesis in Linguistics



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Contents

Time Management Tips	1	The Structure of the Thesis	26
Sample Timeline	2	Abstract26
Before the Project Begins	3	Introduction .....	.27
What is a linguistics senior thesis?	3	Literature review .....	.28
Why write a thesis?	3	Methodology .....	.29
Writing and research opportunities while you're a concentrator	4	Results .....	.29
Discussion and analysis .....	.29	Conclusion .....	.29
Planning the Project	6	Finishing Up	31
How to choose a topic	6	Formatting basics .....	.31
Choosing an adviser	8	Submitting your thesis .....	.35
Choosing a methodology	8	Readers .....	.35
Writing support	9	The thesis colloquium .....	.35
Preparing to do a literature review .....	.10	Appendix	36
Subfields	11	Glossing rules .....	.36
Phonology/phonetics .....	.11	Advising form .....	.38
Morphology .....	.12	IRB (Institutional Review Board) .....	.39
Syntax .....	.13	Funding sources .....	.39
Semantics .....	.18	End Matter	41
Historical linguistics .....	.20	Abbreviations: .....	.41
Sociolinguistics .....	.21	Glossing abbreviations used in examples: .....	.41
Psycholinguistics .....	.23		
Computational linguistics .....	.24		

Time Management Tips

Start writing as soon as possible! Don't put off writing your thesis until you know exactly what your results are—if you do that, you won't have enough time left to finish your project. We recommend starting your abstract, introduction and literature review early in the fall of your senior year, or even in the summer, which will be well before you have your results. If you have your topic, that means you're ready to get started.

If you don't know where to go next with your research, reach out to your adviser to talk about it! They're here to help. Likewise, if you need help with formatting, outlining, organizing your writing, or any part of getting your ideas down on paper, reach out to the Departmental Writing Fellow! (You'll find more information on the DWF and other sources of support in part 2 of this handbook.)

Make sure to give your adviser enough time to give you feedback. Your adviser is a busy person, just like you are. If you'd like comments and suggestions on work you've completed, don't wait until the night before you need it to send it to your adviser. Good practice is to give your adviser at least a week, so that they can fit your work into their schedule.

Keep in mind that you'll also be enrolled in other courses while you're writing your thesis. Set aside time to work on your thesis every week, just as you would set aside time for any of your courses.

If you are a joint concentrator, make sure you're aware of, and keeping up with, all deadlines for your other concentration! Some concentrations, such as computer science, have earlier deadlines than linguistics does.

Sample Timeline

Junior Year, Spring

- *Meet with Director of Undergraduate Studies (DUS) and Assistant Head Tutor (AHT) to discuss 98b options Spring registration deadline
- *Take 98b and investigate a research topic with an adviser Spring semester
- Develop a topic for your thesis and choose a thesis adviser Summer/early fall

Senior Year, Fall

- *Return signed advising form to DUS Add/drop deadline
- *Begin taking 99a Fall semester
- *Apply for IRB approval, if necessary Beginning of fall semester
- Collect data September–December
- Finish first draft of Abstract, Intro, and Lit Review September–November
- Finish first draft of Methodology November–December
- Finish first draft of Results & Discussion December–January

Senior Year, Spring

- *Winter break ends, begin taking 99b January
 - Revise first drafts January–February
 - Write conclusion January–February
 - Give complete draft to adviser for final feedback Mid-February
 - Complete final revisions Mid-February to Mid-March
 - *Submit thesis 12 p.m., Friday before spring recess
 - *Present at thesis colloquium Late April
- * = departmental requirement or deadline

Before the Project Begins

What is a linguistics senior thesis?

A linguistics thesis is an original research project undertaken during your senior year at Harvard College. You will conduct research into past literature on your topic, conduct analysis of relevant data (including designing and running an experiment, where relevant) and, eventually, produce a written final product of between 50–70 pages. Your work will fall under one of the linguistic subfields (phonetics/phonology, syntax, semantics, morphology, historical linguistics, sign linguistics, psycholinguistics, sociolinguistics, computational linguistics) you've studied during your time as a concentrator at the department. During the course of your project, you'll work closely with an adviser, a faculty member who will guide you through the process and help you refine your ideas. Your thesis will be an original piece of linguistic scholarship and will serve as a 'capstone' of your time at Harvard.

Senior linguistics concentrators are not required to write a thesis. However, a thesis is required for those who wish to graduate with honors in linguistics.

Why write a thesis?

The decision to write a thesis should be taken seriously. A thesis represents a large time commitment and a significant intellectual undertaking. It's especially important to stress that writing a thesis is not in any sense an objectively 'better' option. Choosing to write a thesis simply means that you'll be prioritizing an independent linguistics project during your senior year. Choosing not to write a thesis gives you more of an opportunity to prioritize something else that you care about, such as an extracurricular or new classes that you're taking.

We'd encourage you to reconsider writing a thesis in linguistics if you feel that your choice is primarily motivated by external pressures. That is, if the only reason you want to write a thesis is because someone else (such as parents, friends, etc.) thinks you should, now may be the time to rethink. Don't choose a thesis because it seems like everyone else is doing it. Your experience writing a thesis will be your own, not theirs, and this should be a decision you make for yourself. Similarly, if the only reason you're considering writing a thesis is to graduate with honors, you may also want to reconsider. The thesis requires deep and persistent engagement with a topic, and unless you have a genuine interest in that topic, the process will not be intrinsically rewarding. You should feel positively drawn towards writing a thesis, rather than worried about the negative consequences if you don't.

However, you might like to consider writing a thesis in linguistics if you feel yourself drawn to academia. If you are considering graduate school in linguistics or the social sciences, the humanities, or even the sciences, a thesis can be an excellent educational experience for you. Writing a thesis is the closest you can come as an undergraduate to understanding what advanced graduate study will look like. It provides you with the opportunity to test and hone your skills as an independent researcher and, importantly, to make sure that you like the process of independent research. It's a good way to gain some self-knowledge. If you don't like key aspects of writing your thesis (independent

SECTION ONE

research, the writing process, intellectual debate and stimulation) you will likely not enjoy writing a master's thesis or dissertation. Alternatively, many people who had not considered graduate school found the thesis writing process so appealing they changed their future plans.

If you're still unsure about whether or not to write a thesis and the deadline to make a decision about this is approaching, it can help to meet with the DUS or another faculty member to talk it through, and we encourage you to do so!

Writing and research opportunities while you're a concentrator

As a linguistics concentrator at Harvard, you will have many opportunities to undertake research in theoretical and experimental linguistics, or to conduct interdisciplinary research involving linguistics. Among these opportunities are sophomore and junior tutorials (Ling 97r and Ling 98a), a research-oriented seminar (Ling 98b) and the senior thesis writing workshops (Ling 99a and Ling 99b). The research skills you'll learn in these courses will be valuable to you while you work on your thesis, and, ideally, they'll even spark the idea that becomes something you can spend your senior year exploring.

Tutorials (Ling 97r and Ling 98a)

Tutorials are seminars led by graduate students on linguistics topics that are not covered (or not covered in depth) in introductory linguistics courses. A tutorial consists of 6 sessions of two-hour long classes. Students will take two successive tutorials in one semester in order to fulfill the requirements of Ling 97r and Ling 98a. In the normal course of events, you will take Ling 97r in the spring of your sophomore year and Ling 98a in the fall of your junior year. To determine which tutorials you'll take, you'll rank all the tutorials offered by the department before the semester starts, and you'll be assigned to a tutorial based on your preferences and the enrollment level of each tutorial.

The goal of tutorials is to help you read and understand a topic in depth, practice the skills needed in the field, and undertake your own research project. Though the assignments vary from tutorial to tutorial and depend on the instructor and the topic, tutorials usually require students to write reading responses, complete exercises, and, very often, turn in a final research paper. We recommend that you write down the questions and sub-topics that interest you while taking tutorials, so that you can think about the possibilities of turning these questions into a research project. (In fact, we recommend doing this during every linguistics class or lecture you attend—you never know when an idea will occur to you!)

The individual tutorial (Ling 98b)

Ling 98b is intended exclusively for juniors concentrating in linguistics. It is a requirement for honors candidates (except for joint concentrators; if you have any questions about whether you are required to take this, consult with the DUS). Ling 98b is an individual tutorial (directed reading/independent research) with an adviser, who may be a professor, post-doctoral researcher, or graduate student of your choice (in agreement with the DUS and AHT). This adviser is typically someone affiliated with the Department of Linguistics at Harvard, but this isn't strictly necessary: you can find your adviser in another department, or even in another university, if this is the best fit for your research topic.

Once you've decided to enroll in 98b, the process of finding a topic and adviser looks like this: By the registration deadline of the spring of your junior year, you'll need to meet with the DUS and AHT to discuss possible topics and advisers. You'll then take the initiative to set up meetings with people working on your area of interest, in order to select your adviser and narrow down your research topic. Then, for the rest of the semester, you'll meet with your adviser regularly, in order to present and discuss your findings. It is highly recommended that you use handouts when you conduct these discussions, so that you have a record of what you talked about and a place to take notes during your meeting.

At the end of the semester, you'll need to submit a final paper, which will typically take the form of a literature review or research report. The handouts you've used in your meetings during the semester will be a valuable foundation for this final paper. Ideally, this paper will lead to a thesis topic proposal, which you'll develop during your senior year. But don't worry—your topic isn't set in stone at this point. You can still change the topic of your thesis at the beginning of your senior year, if necessary.

Planning the Project

Once you've decided to write a thesis, you'll need to choose a topic and select an adviser. These are big decisions and will affect the rest of your senior year, and for this reason, you might feel stress or pressure around them. Don't let them stress you out too much, though—instead, think of the senior thesis as an opportunity to explore one topic you're interested in, and to develop a good working relationship with your adviser. If you're interested in several topics, choosing one doesn't mean that you'll never get to research the others later on down the road, perhaps in graduate school or in some other capacity. The following section is meant to help make your decisions a bit easier and more straightforward. And remember, if you're having difficulty with any part of this process, there are many people here to help you, both in the department and outside of it.

How to choose a topic

By the time you're a senior, you'll have taken Ling 98b, an independent research course designed for junior concentrators in linguistics. Ideally, you will have arrived at a research topic that you'd like to develop into a thesis by the end of the semester in which you take Ling 98b.

Good research topics in linguistics can be arrived at in many ways. Consider the courses you've taken. What stood out to you, or particularly interested you? It's a good idea to let your interests be your guide when it comes to your thesis—after all, you'll be working on this project for a considerable amount of time. Think of the earliest courses you took in linguistics—what sparked your interest enough to become a concentrator? What are some questions that you would still like to answer? Did you take any tutorials that particularly interested you? Would you like to expand upon any of your term papers? Is there a particular feature of your own speech, or the speech of your friends, that interests you? Is there a language that fascinates you?

One way to find topics is to read an article, a monograph, or a book discussing a language (or languages) and to ask whether the descriptive generalizations made in the work (and the theories behind them) also cover a language not discussed there, but about which you have relevant knowledge. If the data in Language L, the language you know, differ from those discussed in the work you're reading, you can then ask whether the theory proposed in the work can be extended to the 'new' data as-is or with minor changes, or whether significant revision to the proposal is needed to cover the language you know. Another way to look for topics is in the 'directions for future research' or 'open questions' section of an article or book, typically found towards the end, which often identifies predictions or speculations that are open for researchers to answer.

When you're considering what topic you'd like to pursue, brainstorm. Write down at least 5 topics that intrigue you. Then, talk with friends, teaching fellows, and/or professors to decide which topics are the most interesting to you. After you've decided on a topic, you're ready to begin looking for an adviser. This brainstorming step can take place before 98b, or afterwards, if you feel that you need a change in topic.

What are the potential subfields in which you can write a thesis?

The field of linguistics contains many subfields. However, the Department of Linguistics at Harvard does not have faculty members who specialize in every subfield, nor does it offer courses on every subfield—there are simply too many! Nevertheless, if you would like to write a thesis on a topic in a subfield that isn't represented by a faculty member here at Harvard (such as sociolinguistics), that's perfectly fine! Speak to a faculty member about this, and together you can decide which adviser might be the best fit for you.

Linguistics concentrators at Harvard have written theses in a wide variety of subfields. Here are some sample titles:

Syntax:

- *The original word jumble: A case study of Latin word order in the Vindolanda tablets* (Naomi Wills, 2014)
- *Variation in Czech: The use of the prothetic v in informal speech* (Sasha Benov, 2016)

Semantics:

- *An experimental investigation of modification and pragmatic contrast in English and Japanese* (Anna Alsop, 2018)
- *Factivity and polarity in Modern Greek and Japanese* (Rebecca Jarvis, 2019)
- *Modality in Lebanese Arabic: An event-relative approach* (Jad Wehbe, 2019)
- *A unified contrastive analysis of lateral shift in American Sign Language* (Taylor Joyce, 2019)

Computational:

- *Presuppositions and Synchronous Tree Adjoining Grammar* (Athena Braun, 2019)
- *Stylometric features for multiple authorship attribution* (Brian Yu, 2019)

Phonetics/Phonology:

- *Kikuyu tone revisited: Phonetics and phonology* (Jake Freyer, 2015)
- *Efficacy of an app-based, visual-acoustic biofeedback treatment for /r/ misarticulation* (Christian Savarese, 2019)

Historical:

- *The origins and development of the English casual slang suffix -s* (Jack Weyen, 2016)
- *The accusative and infinitive construction in Latin: An integrated approach* (Marina Fisher, 2009)

Sociolinguistics:

- *The influence of teacher attitudes in indigenous language bilingual programs* (Samantha Berman, 2019)
- *Language ideologies and linguistic relativism in Catalonia and Valencia* (Aidan Connaughton, 2019)

Psycholinguistics:

- *Contrastive inferences under cognitive load* (Dylan Hardenbergh, 2016)
- *Singin' in the brain: Music in expressive aphasia treatment* (Lauren Boranian, 2016)

Morphology:

- *Thematic role assignment at the morphosyntax/semantics interface: From linguistics to neuropsychology* (Priyanka Sen, 2016)
- *Let me double check: Multiple checking, the structural ergative, and the great agreement puzzle* (John Stokes, 2011)

Choosing an adviser

When you write your thesis, you will be supervised by an adviser. This can be the same adviser you worked with during your time in Ling 98b, or, if you change your topic, can be an entirely new person. The adviser plays a very important role in the thesis process. Generally, the adviser is the ‘final word’ on your thesis in terms of approving your topic, methods, and the final product, and is involved in reading drafts and meeting with you frequently. You should talk with your potential adviser to be clear about what you expect from them, what they expect from you, and what they understand their responsibilities to be.

Any faculty member in the Department of Linguistics at Harvard may serve as your adviser. A faculty member at another department at Harvard, or even at another university, may also be your adviser, subject to approval by the Director of Undergraduate Studies. When in doubt, set up a meeting with the DUS!

There are several strategies you may employ when choosing an adviser. The easiest is to choose someone in whose course you’ve been enrolled before. If you share research interests with that professor, set up a meeting with them to discuss potential projects. Another strategy is to browse the departmental website and look at the research interests of each faculty member. Do any of their interests overlap with yours? If you are still drawing a blank, or if you’d like more input, schedule a meeting with the Director of Undergraduate Studies, or the Assistant Head Tutor, to find the adviser who’s the best fit for you.

The best time to select an adviser and ask them to advise your thesis is the spring of your junior year. This often happens at the end of 98b, but, again, if you feel a need to change your topic, does not have to. When you ask your potential adviser to advise your thesis, you don’t need to have a precisely defined research question yet, but you should at least have a few ideas about potential directions in which your project could go. Your adviser will help you frame a good research question. Don’t be afraid to brainstorm with your adviser and to speak up about what you find interesting! This project is about your interests, and should reflect what you’re passionate about. Remember, your thesis project will need to hold your attention—you’ve got a whole year to spend thinking about it!

When you choose your adviser, you’ll need to fill out the advising form (a copy of which may be found in the appendix) and have your adviser sign it. You’ll need to turn this in to the Director of Undergraduate Studies by the add/drop deadline of the fall of your senior year.

Choosing a methodology

Once you’ve decided on your research question, you’ll need to pick a methodology with which to answer it. Linguists use many different methods to collect data and answer questions about language, including surveys, interviews, recordings, computer models, video analysis, and corpus analysis.

One of the things you should keep in mind when choosing a methodology is its practical feasibility. Can this project be executed by you in a few months? What kinds of equipment will you need for the project, and does the department have access to it? Do you have access to a large enough number of speakers of the language, dialect, or language community you’re studying? Do you have access to the kinds of data that you need? Failing to consider any of these questions at the outset of your project can mean

that you end up investing a lot of time into a project that is unfortunately not feasible. Past projects have stalled and had to be seriously revised or even abandoned when students discovered that there weren't enough local speakers of a dialect to conduct interviews, or when they realized that collecting the data they wanted would involve traveling and fieldwork that they didn't have the time or resources to pursue. Careful planning in the beginning (in coordination with your adviser) can ensure that this doesn't happen to you.

If you're planning to use existing data, such as pre-existing video or audio recordings, interview data, historical documents or ancient writings, or any other kind of corpus, make sure that this data is accessible to you. Do you know enough about the language or languages under investigation to be able to sift through the data effectively? If the data is proprietary, or belongs to a private institution, do you have access to it, or can you get access to it? Do you need permission from the owner of the data in order to use it in your experiment?

Another consideration is personal temperament. Do you enjoy working with people and conducting interviews? Maybe you're good at statistical analysis, or you enjoy working with computers. On the other hand, maybe you know from problem sets in the courses that you've taken that you don't like annotating spectrograms or drawing syntax trees. Since you'll be working on this project for a whole year, you'll want to choose a methodology that suits you.

Writing support

Although completing your thesis will require a great amount of individual work time, there will be plenty of opportunity for you to engage with peers, faculty, and other individuals as part of your research and writing process.

First, don't hesitate to talk with friends and fellow students when you're considering what topic you'd like to pursue. You can also share with them your research plans and ask them for feedback on the clarity of your writing. Of course, your adviser, with whom you will be meeting frequently, will be giving you feedback at every stage of your research and writing process. Additionally, there are other places within the university where you can seek feedback and advice, such as the Writing Center and the Academic Resource Center. At the Writing Center (<https://writingcenter.fas.harvard.edu>), you can make appointments with peer writing tutors to discuss your work as frequently as twice a week, if needed. At the Academic Resource Center (<https://academicresourcecenter.harvard.edu/home>), you can find help with time management and subject matter-specific questions.

In addition, the Department of Linguistics at Harvard offers two linguistics senior thesis writing workshops: Ling 99a (taken during the fall of your senior year) and Ling 99b (taken during the spring of your senior year). Ling 99a and Ling 99b are mandatory for thesis writers who concentrate on linguistics. Joint concentrators are not required to take Ling 99a or Ling 99b., since other concentrations might have similar workshops that help with thesis writing. You should choose the one that best fits your needs. The main purpose of the Ling 99 series is to provide you with guidance in writing in an organized way. It is designed to complement, but not replace, your meetings with your thesis adviser. It offers a forum in which to share your work with other students writing theses so that you will learn from each other, both during and after the workshop, as you write your thesis. Ling 99 meets regularly during both semesters to ensure that you're organized, that you're making good progress, and that you're confident about your next

steps. Remember, if you're enrolled in the Ling 99 series, you must attend and participate in all meetings of the workshop. Your attendance and performance in the workshop will be communicated to your adviser and will be considered in your adviser's evaluation of your thesis. (Ling 99 itself is graded SAT/UNSAT.)

Finally, the Linguistics Department has a dedicated Departmental Writing Fellow. The DWF is an advanced graduate student in linguistics whose job it is to help you with all aspects of writing your thesis, from framing your ideas to formatting your references. Meetings with the DWF are not meant to replace meetings with your adviser; rather, the DWF is here to help you with the form of your thesis, while your adviser helps you with the content. You'll meet the DWF at your first meeting of 99a. The DWF is available to meet by appointment throughout your senior year, and your Ling 99 instructor may even require you to meet with the DWF at certain times during the process of writing your thesis. Don't be shy in reaching out to the DWF—their job this year is to meet with you and to help you.

Preparing to do a literature review

As soon as you know what topic or subject area you'd like to investigate for your thesis, you should begin preparing to do your literature review. A literature review is important for identifying research questions. It has two functions: The first is to demonstrate your familiarity with previous work on your topic and your understanding of the complexity of this topic. To ensure that your literature review fulfills this first function, read widely in your topic. Ask your adviser for recommendations about what books and papers to read; search the Harvard Library's HOLLIS catalog system for sources related to your topic; look up books and articles listed in the bibliographies of books and articles you've already read. When you read, you should take notes on the articles and books that you read and look for common themes, so that you may organize your review around them. When you take notes, you should ask these questions:

- What is the main point of the piece?
- What has been discovered by the authors of the article or book?
- What problems remain?
- How does it relate to your research topic?

The second function of a literature review is to lay the foundations for your paper and provide the theoretical motivation for your work, so that it will be clear what the real contribution of your thesis is. Are you bringing in any new empirical knowledge relevant to the topic? Are you providing argumentation to support an existing opinion, or are you opposing one? Are you contributing a new analysis to the topic? Consider these questions as you read and take notes.

Your literature review will not be lengthy (it should only be about 10%–25% of the whole thesis). When you do your literature review, you don't have to include every paper you get your hands on. The goal of a literature review is to be thorough, but selective. A good literature review is a presentation of the main previous results and arguments related to the point to be advanced in your thesis.

Subfields

As mentioned in Section 2.2, the field of linguistics contains many subfields. While the Department of Linguistics at Harvard does not have faculty members who specialize in every subfield, you can definitely write your thesis in the subfield you like the most! If it isn't represented here at Harvard, speak to the DUS about this, and together you can decide which adviser might be the best fit for you.

Phonology/phonetics

Preliminaries

By the time you have chosen to write a thesis in phonetics or phonology, you'll have taken Ling 105 and perhaps Ling 115. Speak to the DUS if you haven't taken either of these classes but are still interested in writing a phonetics/phonology related thesis.

As with many other subfields, your thesis in phonetics or phonology may be experimental or theoretical. Theoretical papers in phonology often consider a phenomenon in the light of cross-linguistic typology—that is, they examine whether the behavior of a phenomenon in a given language supports or refutes some proposal for how the phenomenon works in general across languages. However, your thesis could also be more descriptive, detailing how a particular process works in a given language or languages; an example of this is *Kikuyu tone revisited: phonetics and phonology* by Jake Freyer (2015). Experimental theses can involve analyzing some body of data (either data that you gather yourself or data from existing corpora) relating to a phenomenon in some language or languages. A good example of an experimental phonology thesis is *Lexical tone acquisition in English speakers: a naturalness bias in learning tonal spreading rules* by Julia Glenn (2012).

Prosody and poetics are also fruitful areas for topics in this subfield. Many previous concentrators have successfully written linguistics theses on prosody and poetics-related topics, such as *Text setting patterns in the secular chansons of Gilles Binchois* (Lauren Goff, 2016) and *Art without iambs: the free verse poetics of Kirill Medvedev* (Michael Goncalves, 2014). If you're a joint concentrator in another humanities field such as Classics, an area studies department, or English, you may wish to consider writing a thesis in this subject area.

Data collection

The data you will use for your phonetics or phonology project may either be data you collect yourself or data that is already available. If you choose to collect your data yourself, you'll need speakers available who speak the language in question and a place and equipment to make your recordings. The Linguistics Department has a phonetics booth (Boylston 334) which you may use; speak to your adviser or to someone in the administrative office about getting access to the booth. You should also be familiar with tools like the free speech analysis software package Praat (<http://www.fon.hum.uva.nl/praat/>), which you can use to annotate and analyze your recordings. For more information about recruiting speakers and getting IRB (Institutional Review Board) approval for your project, see the morphology section and the appendix of this handbook.

Section three

If you would like to use data that's already available, you have a number of choices. For a phonology project, it is often sufficient to work with existing resources such as grammars, lexicons, or secondary literature, since the relevant data are already available. In fact, many phonology papers start when phonologists notice interesting patterns that are described but not analyzed in grammars.

If, on the other hand, you'd like to do a phonetics or experimental phonology project and you'd like to use a corpus of spoken language, there are various options available, many of them already annotated. For example, for American English, there's the Buckeye Corpus (<https://buckeyecorpus.osu.edu>), TIMIT (<https://catalog.ldc.upenn.edu/LDC93S1>), the Santa Barbara Corpus of Spoken American English (<https://www.linguistics.ucsb.edu/research/santa-barbara-corpus>), and Switchboard (<https://www.isip.piconepress.com/projects/switchboard/>), to name a few. Speak with your adviser to find the corpus or data set that's right for your project.

Data presentation

A number of programs and online resources are available to assist you with your phonetics or phonology thesis. If you choose to use LaTeX, the tipa package will allow you to type IPA characters more quickly and easily. If you use other word processing programs, there are various online IPA keyboard resources that may make your life easier, such as ipa.typeit.org. If you're working within an OT (Optimality Theory) framework, software such as OT Soft (<https://linguistics.ucla.edu/people/hayes/otsoft/>) and OT Help (<https://people.umass.edu/othelp/>) could be useful for you.

When you analyze your data for an experimental phonology or phonetics project, a statistical or programming background can be useful, although it's not strictly necessary. The majority of students who use statistical methods to analyze their data use R and Python as statistical and programming environments. If you are familiar with these programs, or if you'd like to become familiar with them, it's worth investigating with your adviser how they could be helpful to you in your project.

Morphology

Preliminaries

Before you choose to undertake a thesis project in morphology, you should have taken Ling 104, and potentially also Ling 143. If you haven't taken these courses but would still like to write a thesis on a morphology topic, please consult with the DUS.

Data collection

Many research projects on morphology involve collecting data from a language that is less well studied or is endangered. You may need to regularly meet with consultants or recruit human subjects to run experimental studies. A list of questionnaires that can be used for linguistic fieldwork can be found here: <https://www.eva.mpg.de/lingua/tools-at-lingboard/questionnaires.php>. When you do fieldwork, you should try to make sure that your work is in tune with the goals and perspectives of the community whose language it represents. Your consultants should know what they will be doing during your interviews and should be comfortable with the methodology and the outcome.

Some linguistic fieldwork is 'exempt' from IRB (the Institutional Review Board) regulations, but not all is. Consult with your adviser to see if your project requires IRB

approval. You can find more information about the IRB and its human subject research requirements in the appendix.

Data presentation

When you report data you've collected from fieldwork, you should indicate the source of the data in as much detail as possible. As an illustration, we provide below the requirement from the journal *Language*:

“Authors reporting original field work should be careful to report the appropriate metadata: where and when data were collected, how it was collected (in detail), and characteristics of those it was collected from including age, education, gender, whether bi- or multilingual, etc., along with a report on the general conditions of the language and community.”

And here is an example of indicating the source of the language under investigation:

“Chukchee is a Paleo-Siberian language of the Far East, closely related to Koryak and Alyutor and also to Itelmen. Though the 1979 census establishes a population of 14,000 for Chukchee, most of these people speak Russian as their first language and have a passive or semi-active knowledge of Chukchee. According to my own informal estimate, the number of people who can really speak Chukchee is now less than a thousand, and language attrition rate is very high (see Polinskaja 1988 for a brief description of semilingualism in Chukchee.)”

[From Polinsky, Maria. 1994. Relativization in Chukchee. In: Aronson, Howard (ed.), *Papers from the 7th conference on the non-Slavic languages of the USSR*. Chicago University Press, Chicago. 241.]

In documenting the data, the Leipzig Glossing Rules (see appendix) are a good baseline standard. You are expected to give a three-line presentation of your examples. The first line presents the data from the target language, the second line gives morpheme-by-morpheme glosses, and the third line has an idiomatic full-sentence translation. Segmentable morphemes are separated by hyphens, both in the example and in the gloss, as illustrated below. You should make sure to have the same number of hyphens in the example and in the gloss.

- (1) Gila abur-u-n ferma hamišaluğ güğüna amuq'-da-č. *Lezgian*
now they-OBL-GEN farm forever behind stay-FUT-NEG
'Now their farm will not stay behind forever.'

[From Haspelmath, Martin. 1993. *A grammar of Lezgian*. Berlin: Mouton de Gruyter. 207.]

Departures from the Leipzig Glossing Rules are acceptable if warranted, but should be noted in the thesis.

Syntax

Preliminaries

Before you choose to write a thesis in syntax, you should have training in syntactic theory equivalent to that taught in Ling 102, Ling 112 and Ling 212. If you haven't taken any of these classes, you'll need to discuss this with the DUS.

If you think you'd like to write a thesis in theoretical syntax, but you're struggling to find a topic, look to a language other than English (including less familiar dialects). In general, it's easiest to work on a specific syntactic construction in a language other than English and examine what it tells us about syntactic theory and the interfaces of syntax. Cross-linguistic investigations help expand our understanding of the rich nature of cross-linguistic variation, motivating us to reflect on theoretical assumptions about the nature of syntax in general.

Data collection

A syntax thesis begins with the presentation of relevant syntax data and goes on to explain why they are interesting (i.e., what questions or problems they raise). A common way to collect syntactic data is by asking native speakers of a language whether a sentence is grammatical or not. This is known as a grammatical judgment task. To successfully create a grammatical judgment task, you need to be aware of the syntactic property under consideration and what the best syntactic test is to target this property. Your adviser will help you construct the sentences for your survey.

If you already know people who natively speak the language you are investigating in your thesis, you can informally ask them for judgments. But if you want to run an experiment and do a quantitative data analysis, you will have to create a questionnaire and post it online, so that it can reach a large enough number of native speakers for your purposes. To construct your questionnaire, you can use Qualtrics (<https://harvard.qualtrics.com/>) or Turktools (<http://turktools.net/>). To recruit participants, you can use Amazon Mechanical Turk (<https://www.mturk.com/>), Prolific (<https://prolific.co/>), or social media. Depending on what type of data you decide to collect, your research may be subject to IRB approval (talk to your adviser and see appendix). Additionally, participants recruited from Amazon Mechanical Turk and Prolific should be paid. For this type of task, the standard rate is \$6 per hour. (See the appendix for funding opportunities when conducting experimental work.)

When you write your thesis, you should include your questionnaires and any other data collection materials either in the body of your thesis or in an appendix. For example, below is the data collection materials from the section “Construction of Stimuli” in a paper on bound pronouns in embedded clauses.

“For each of the 3 targeted phenomena, we constructed 5 baseline sentences in which the relevant dependency occurs in a monoclausal frame, yielding a total of 15 sentences, shown in (21)–(23).

(21) *BaseLine (Multiple questions)*

- a. Sandy wondered which man bought George which shirt.
- b. Kim doesn't remember which man lent Jill which magazine.
- c. Abby found out which man told Barry which joke.
- d. Mary asked which man sent Fred which letter.
- e. Mark discovered which man threw Bobby which ball.

.....”

[From Grano, Thomas and Howard Lasnik. 2018. How to neutralize a finite clause boundary: Phase theory and the grammar of bound pronouns. In: *Linguistic Inquiry*. 49(3): 465–499. 475.]

When conducting a survey, you'll need to introduce it to your subjects and include instructions. The below example is from a study on the usage of words like *himself* and *herself*:

Instructions

Thank you very much for participating in this survey!

You will be presented with 30 questions consisting of a context sentence and a bolded target sentence containing the word *himself* or *herself*.

After carefully reading both the context and the target sentence, please indicate how natural the **target sentence** sounds to you by moving the slider below the sentence towards the right or left, where **1 (left) is least natural** and **7 (right) is most natural**.

What do we mean by saying a sentence sounds "natural"? Pretend your friend is saying the sentence out loud to you. If you intuitively think it sounds like something a native English speaker *could* say, you would rate the sentence as more natural; if, however, the sentence makes your friend sound like they are *not* a native English speaker, you would rate it as less natural.

We'll start with some example sentences.



A sample sentence might look like this:

Example 1: *The man bought a newspaper on his way to work.*

Most native English speakers would rate this sentence as totally natural. If you share this intuition, you should drag the slider below all the way to the **right** toward **7**:

less natural 1 2 3 4 5 6 more natural 7



You may also find it helpful to make sure that your subjects are paying attention by including some questions meant to serve as an 'attention check.' These are usually called filler items. Anyone answering the survey question below will give an unusual answer if they do not read the instructions:

Context: No matter your judgement for the sentence below, move the slider all the way left to 1.

Beth threw away the picture of herself.

less natural 1 2 3 4 5 6 more natural 7

Any survey where the answer to this question is not 1 will then be discarded.

[Previous three images from a study conducted by Shannon Bryant and Isabelle Char-navel, 2019.]

For grammaticality judgments, you can use a 6-point Likert scale, as shown above, or a grammaticality slider, as shown below. You can also ask for binary judgments (0/1, true/false, grammatical/ungrammatical).

When a musician and a musician talk, he smiles at him.

very awkward very natural

[From a study conducted by Kathryn Davidson, Dorothy Ahn, and Rebecca Jarvis, 2018.]

Those taking the survey are invited to move the point on the slider to the place that they feel corresponds with the grammaticality of the sentence.

Data presentation

Minimal pairs

When you present syntactic examples, the best way to do this is through minimal pairs, where a single difference between two sentences illustrates the point being made. For example, the minimal pair below demonstrates the ‘*that*-trace effect’; i.e., the complementizer *that* in English cannot be followed by a trace. In the example minimal pair shown below, (2a) is grammatical while (2b) is not. The only difference is whether the complementizer *that* is present or not. Everything else in the sentences, such as the

landing sites of *wh*-movement, the predicates in the matrix and embedded clauses, etc., is kept the same:

- (2) a. Who_i do you think [_{CP} t'_i [_{TP} t_i came]]?
- b. *Who_i do you think [_{CP} t'_i that [_{TP} t_i came]]?

Glossing

For any non-English language (including Romance and other semi-familiar languages), a three-line presentation of examples is needed. The first line presents the data from the target language, the second line gives word-for-word glosses, and the third line has an idiomatic full-sentence translation. This is illustrated for French below:

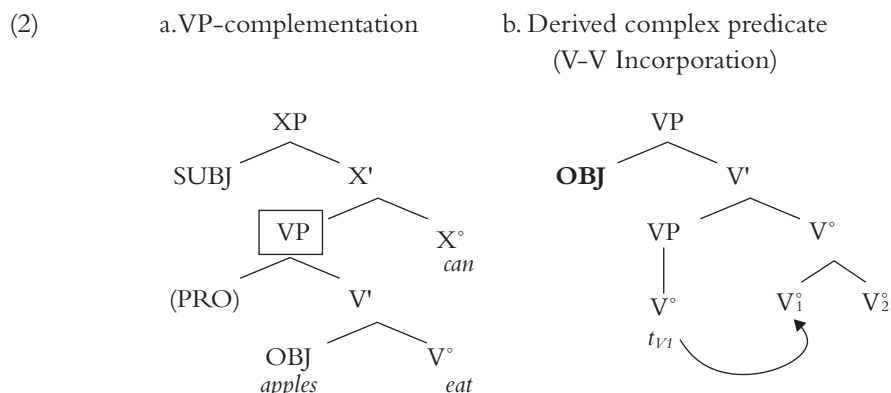
- (3) Est-ce que ces étudiants écriront une thèse? *French*
 is-it that these students write.FUT a thesis
 ‘Will these students write a thesis?’

For transcribing data, we suggest that you follow the Leipzig Glossing Rules (see the appendix for more about these). However, the most important thing is to include coherent and uniform glosses of non-English languages, and to explain the abbreviations you use by including a list in the appendix.

Chart/Tree presentation

If you present a chart or a tree, you should always include a preceding or following paragraph that goes over them in plain prose. An example is presented below:

Tree diagram:



Explanatory paragraph:

“On the one hand are VP-complementation accounts which posit a full syntactic VP structure for the lower verb as in (2a). On the other hand are a variety of complex predicate accounts, in which the object is base-generated (“first-merged”) as the complement of a complex verb, either formed in the lexicon as a compound, or syntactically derived, as in the approach of Saito and Hoshi (1998) illustrated in (2b).”

[From Bobaljik, Jonathan D., and Susi Wurmbrand. 2007. Complex predicates, aspect, and anti-reconstruction. *Journal of East Asian Linguistics* 16.1:27-42. 28.]

Drawing your trees

A syntactic analysis usually involves presenting corresponding syntactic trees. You have several options for drawing trees to include in your thesis. If you choose to use Microsoft Word, trees can be drawn easily using the line-drawing functions. If you are a LaTeX user, the packages *qtree* and *tikzpicture* are specific tools for tree drawing which give

you more options for format setting than a word processing program like Microsoft Word does. Besides Word and LaTeX, there are other possibilities online; these include phpSyntaxTree (<http://ironcreek.net/phpsyntaxtree/>), Syntax Tree Generator (<http://mshang.ca/syntree/>) and the Arboreal font (<http://www.cascadilla.com/arboreal.html>).

As noted above, whenever you include a tree, you should make sure that it corresponds to a paragraph in your thesis that goes over the tree in clear prose.

Semantics

Preliminaries

By the time you have chosen to write a thesis in semantics, you'll have taken Ling 106, and potentially Ling 116 and Ling 216. If you haven't taken these classes but still would like to work on a topic in semantics, you'll need to discuss with the DUS.

You may decide to write your thesis in either theoretical or experimental semantics. A good example of the former is *Factivity and polarity in Modern Greek and Japanese* by Rebecca Jarvis (2019). This thesis investigates the licensing of weak negative polarity items (e.g., *any, ever*) in the complements of factive verbs (e.g., *regret, be surprised*) in two unrelated languages, Modern Greek and Japanese, while jointly probing existing proposals regarding the interaction between factivity and polarity. In addition, a new analysis of the Greek NPI *ésto lígo* is provided.

For an example of a thesis involving experiments, there is *An experimental investigation of modification and pragmatic contrast in English and Japanese* by Anna Alsop (2018). From the literature, we know that the use of prenominal modifiers like *short* leads listeners to infer the existence of similar objects differing along that same scale (so-called contrastive inferences). With a series of three experiments involving a forced choice task, this thesis asks whether these contrastive inferences extend to two types of suprasegmental features, namely, prosodic focus and depictive co-speech gestures. The first two experiments test the effect of focus on the pragmatic interpretation of modifiers both in English and in Japanese. The last experiment tests whether co-speech gesture elicits contrastive inference similarly to lexical adjectives.

Data collection

In semantics, we gather judgments about how sentences are interpreted. While you can begin your work by considering your own semantic judgments (if you speak the language under investigation), it is good practice to check your judgments against those of at least a few other native speakers of the language. To do this, you will provide your subjects with a context and a target sentence and ask them to judge the sentence in the given context. The model below demonstrates this:

- (4) *Context*: The speaker is aware that someone broke into the building last night but doesn't know who:
- a. It was whoever had the access code to the building (though I don't know who it was).
 - b. ★ È stato chiunque abbia il codice di accesso all'edificio, *Italian*
has been who-FC have.SUB.SG the code of access to-the-building
(sebbene non sappia chi sia).
though not know.SUB.SG who be.SUB.SG

- c. ★ A fost oricine avea codul de acces al clădirii, Romanian
 has been FC—who had code—the of access of building—the
 (deși nu știu cine a fost).
 though not know.1SG who it was

[From Ivano Caponigro and Anamaria Fălăuș. 2017. Free choice free relative clauses in Italian and Romanian. *Natural Language and Linguistic Theory* 36 (2):323-363. 338.]

If you want to run an experiment and do a quantitative data analysis, you will have to create a questionnaire and post it online, so that it can reach a large enough number of native speakers for your purposes. To construct your questionnaire, you can use Qualtrics (<https://harvard.qualtrics.com/>) or Turktools (<http://turktools.net/>). To recruit participants, you can use Amazon Mechanical Turk (<https://www.mturk.com/>), Prolific (<https://prolific.co/>), or social media. Depending on what type of data you decide to collect, your research may be subject to IRB approval (talk to your adviser and see appendix). Additionally, participants recruited from Amazon Mechanical Turk and Prolific should be paid. For this type of task, the standard rate is \$6 per hour. (See the appendix for funding opportunities when conducting experimental work.) For an example of questionnaire (including instructions, a target item and a filler item), see the syntax section.

When you write your thesis, you should include your questionnaires and any other data collection materials in an appendix. As an example, you can find below an excerpt from an appendix that contains all the stimuli (video transcript and written text) used in an experiment.

“We use the following conventions: gestures will be written in all-capital letters, and we will indicate the spoken words that align with the gesture by placing them in square brackets. In the positive contexts, material which has been changed from or added to the corresponding neutral contexts has been bolded. By *proposition* we mean the inference licensed by the positive context that conveys the semantic content contributed by the co-speech gesture, and also by its corresponding speech cue (noting that the two are not strictly equivalent given the iconic, analog nature of the co-speech gesture).

(1) **Scenario:** Boy in treehouse

- *Neutral context:* Billy is sad because he’s not with his friends. He starts to cry and his dad goes over to him. Their neighbor Eliza watches and then tells her friend Sarah what happened. Eliza says:
- *Positive context:* Billy is sad because he’s not **up in the treehouse** with his friends. He starts to cry and his dad goes over to him. Their neighbor Eliza watches and then tells her friend Sarah what happened. Eliza says:
- *UP proposition:* The helping was done by lifting the son up.
 - a. John [helped]_{UP} his son and now he’s not crying anymore.
 - b. John [helped]_{UP} his son get up into the treehouse and now he’s not crying anymore.
 - c. John helped his son and now he’s not crying anymore.
 - d. John helped his son get up into the treehouse and now he’s not crying anymore.”

[From Zlogar, Christina and Kathryn Davidson. Effects of linguistic context on the acceptability of co-speech gestures. *Glossa: A Journal of General Linguistics*, 3(1), 73.]

Data presentation

Glossing

As when giving syntax examples, when you give semantics examples for any non-English language, a three-line presentation is needed. The first line presents the data from the target language. On the second line, word-by-word glosses provide information about the meaning and grammatical properties of each word. The third line contains the interpretation of the sentence (or its intended meaning if the sentence is not well-formed). If the sentence was elicited in a context, that context should be provided as well, as shown in (4).

- (5) a. Edose o Giannis dekará gia ti Mará? *Modern Greek*
gave.3sg the John damn_{NPI} about the Maria
'Did John give a damn about Maria?'
- b. ★ Mono i Mará paraponethike pote
only the Maria complained ever_{NPI}
Intended: 'Only Maria ever complained.'

[From Jarvis, Rebecca. 2019. Factivity and polarity in Modern Greek and Japanese. Unpublished Harvard College honors thesis. 107–108.]

For transcribing data, you can follow the Leipzig Glossing Rules if you wish (see the appendix for more about these).

Semantic formula/Chart presentation

When you introduce a semantic formula, it should be followed by text that describes it in plain prose, as illustrated below:

- (6) $[[EXH]]^{q,w}(p) = p_w \wedge \forall q \in ALT(p) [q_w \rightarrow p \subseteq q]$
'Given a sentence p and a set ALT of alternatives to p , $EXH p$ asserts p and negates the alternatives that are not entailed by the assertion.'

Similarly, if you present a chart of your results, it should be preceded or followed by a paragraph that goes over it in plain prose.

Historical linguistics

Preliminaries

Before you write a thesis in historical linguistics, you should have taken Ling 108; you've likely also taken Ling 107. You may additionally have taken courses about a specific language or language family you're interested in, such as Latin or Greek (through the Classics Department), Sanskrit (through the Department of South Asian Studies), Old Church Slavonic (through the Slavic Department), Old Irish (through the Department of Celtic Languages and Literatures), Classical Chinese (through the Department of East Asian Languages and Civilizations), Classical Japanese (also through the Department of East Asian Languages and Civilizations), or a Germanic language such as Gothic, Old English, or Old Norse (different languages are offered by various departments, including English and linguistics). If you're considering tackling a historical linguistics problem for your thesis, you should meet with one of the professors who work on historical linguistics to discuss your topic.

Data collection

When you work on a historical linguistics thesis, you generally do not have living speakers whom you can ask to do phonetics recordings or give grammaticality judgments. Your data will therefore usually come from texts (although this depends on the language or language family you are researching). Speak with your adviser about how to choose a corpus that is right for your research question. Your adviser will help you select material of the correct date and from the correct geographic area.

Data presentation

One of the things you will notice immediately when you study historical linguistics is that each language that is not written using the Roman alphabet has its own transliteration conventions, which differ from each other and also from IPA. When you're writing your thesis, you may use IPA, or you may choose to use the transliteration conventions appropriate to the language you're working on, as long as you make it clear what system you're using and what the characters you're using signify. You should always transliterate anything you present that is not in Roman characters. (You may optionally include the non-Roman characters, as well, but you cannot assume that your reader will be able to read these.) Thus, if you wanted to use book 1, line 64 of Homer's *Odyssey* as an example, you might do it like this:

- (7) τέκνον ἐμόν, ποῖόν σε ἔπος φύγεν ἕρκος ὀδόντων
téknon emón, poíón se épos phúgen érkos odóntōn
“My child, what word has escaped the enclosure of your teeth?” Hom. *Od.* 1.64

When appropriate, you may also wish to add a line of grammatical glosses following the Leipzig Glossing Rules (see appendix). This line would follow the transliteration and precede the idiomatic English translation.

Sociolinguistics

Preliminaries

Although the Department of Linguistics at Harvard does not have faculty members who specialize in sociolinguistics, nor does it regularly offer courses on sociolinguistics, you can definitely choose to work on a topic in this subfield. Speak to the DUS about this, and together you can decide which adviser might be the best fit for you.

Data collection

Your data may be collected through fieldwork, or, alternatively, you may want to run an online experiment. In that case, you will have to create a questionnaire and post it online, so that it can reach a large enough number of speakers for your purposes. To construct your questionnaire, you can use Qualtrics (<https://harvard.qualtrics.com/>) or Turktools (<http://turktools.net/>). If you would like speakers of a widely-spoken language or dialect to take your survey, it will be relatively easy for you to recruit subjects on Amazon Mechanical Turk (<https://www.mturk.com/>) or Prolific (<https://prolific.co/>). However, if you want to look at a less-widely-spoken language or dialect, or if you'd like to aim your survey at a smaller community of any kind, consider recruiting subjects through contacts that you have on social media. Depending on what type of data you decide to collect, your research may be subject to IRB approval (talk to your adviser and see appendix). Additionally, participants recruited from Amazon Mechanical Turk and

Prolific should be paid. For this type of task, the standard rate is \$6 per hour. (See the appendix for funding opportunities when conducting experimental work.)

When you write your thesis, you should include your questionnaires and any other data collection materials either in the body of your thesis or in an appendix.

Data presentation

When you report data you've collected from fieldwork, you should indicate the source of the data in as much detail as possible. As an illustration, we provide below the requirement from the journal *Language*:

“Authors reporting original fieldwork should be careful to report the appropriate metadata: where and when data were collected, how it was collected (in detail), and characteristics of those it was collected from including age, education, gender, whether bi- or multilingual, etc., along with a report on the general conditions of the language and community.”

If these data are from non-English speakers, they should always be followed by an English translation. Depending on your research question, you may also wish to add a line of grammatical glosses following the Leipzig Glossing Rules (see appendix). This line would follow the example and precede the idiomatic English translation.

When you report the results of your experiment(s), the chart should be preceded or followed by a paragraph that goes over them in plain prose. An example is presented below.

Chart:

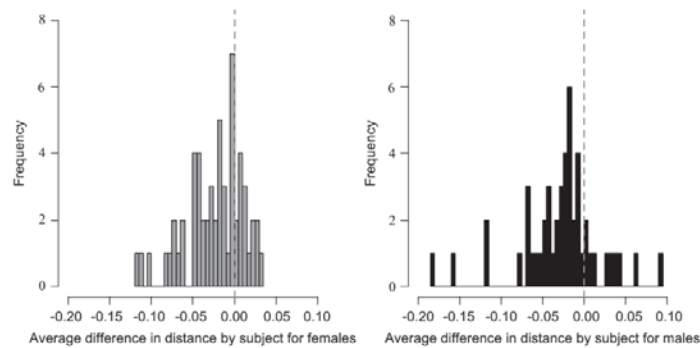


Fig. 2. A histogram of each participants' averaged difference in distance value. Female participants are on the left panel and male participants are on the right. The dashed vertical line denotes the 0 point of no change. A negative value indicates accommodation, while a positive value indicates divergence.

Explanatory paragraph:

“Fig. 2 presents histograms for female and male participants of each participants' averaged difference in distance value. The dashed vertical line denotes the 0 difference in distance point of no change. The majority of subjects fall on the negative side of the scale, indicating the tendency to accommodate to the vowel spectra of the model talker.”

[From Babel, Molly, 2012. Evidence for phonetic and social selectivity in spontaneous phonetic imitation. *Journal of Phonetics*, 40(1):177–189. 181.]

Psycholinguistics

Preliminaries

Typically, students who write theses on a psycholinguistics topic are linguistics concentrators with a secondary in psychology, or linguistics concentrators with Mind Brain Behavior track, or linguistics concentrators with a related field in psychology.

Data collection

To collect your data, you may run a series of experiments online. To construct your questionnaire, you can use Qualtrics (<https://harvard.qualtrics.com/>) or Turktools (<http://turktools.net/>). To recruit participants, you can use Amazon Mechanical Turk (<https://www.mturk.com/>), Prolific (<https://prolific.co/>), or social media. Participants recruited from Amazon Mechanical Turk and Prolific should be paid. For this type of task, the standard rate is \$6 per hour. (See the appendix for funding opportunities when conducting experimental work.) For an example of questionnaire (including instructions, a target item and a filler item), see the syntax section.

Alternatively, you may want to run a study at a lab involving an experimental method like eye-tracking. If that's the case, speak to your advisor to see what is feasible at Harvard and given the time constraint you have.

In both cases, as your research will involve human subjects, it will require IRB approval (see appendix).

Data presentation

When you report your results, the figures should be preceded or followed by a paragraph that goes over them in plain prose. An example is presented below.

Chart:

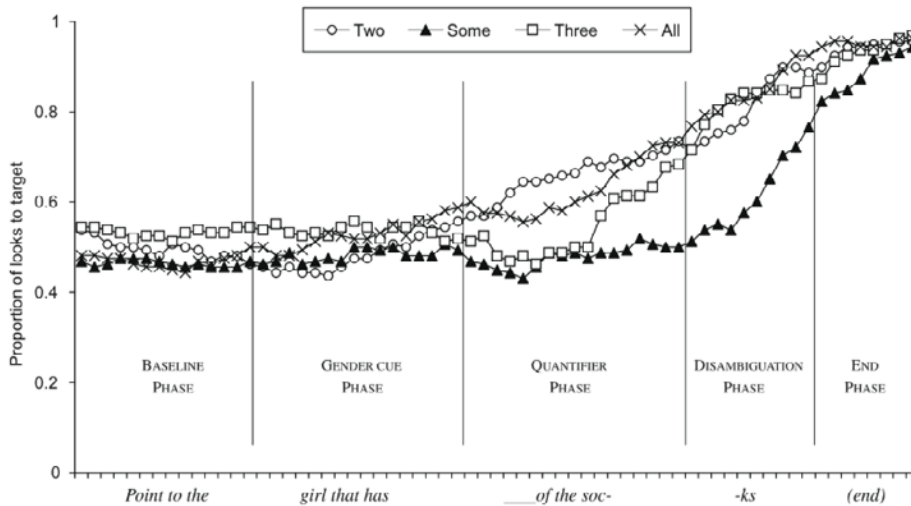


Fig. 3. In Experiment 1, the time-course of looks to Target for the four trial types.

Explanatory paragraph:

“Fig. 3 illustrates that prior to the onset of the quantifier, the proportion of looks to the Target was around chance for all terms. Unsurprisingly, there were no reliable effects of Quantifier Scale or Strength during the Baseline and Gender phases (all F 's < 1.00, all p 's > .30). However during the Quantifier phase, fixations to the

Target increased when participants heard two (68%), three (59%), and all (66%) but not when they heard some (48%). During this period, there was no main effect of Quantifier Scale ($F(1,16) = 2.15, p > .10$; $F(1,15) = 2.24, p > .10$) or Quantifier Strength ($F(1,16) = 2.24, p > .10$; $F(1,15) = 1.80, p > .10$). Critically, however, there was a significant interaction between the two variables ($F(1,16) = 14.04, p < .01$; $F(1,15) = 16.85, p < .01$).”

[From Huang, Y.T. and Snedeker, J., 2009. Online interpretation of scalar quantifiers: Insight into the semantics–pragmatics interface. *Cognitive psychology*, 58(3):376–415. 386.]

For advice on writing methods and results sections of experimental papers in a psychology-related topic, you should refer to the American Psychological Association (APA) guide. The website of the APA can be found here: <https://apastyle.apa.org/>.

All your questionnaires or any other data collection materials should be included in your thesis.

Computational linguistics

Preliminaries

Typically, those who write theses on a computational linguistics topic are joint concentrators in linguistics and computer science.

Theses in computational linguistics tend to fall into two categories with respect to their subject matter. One category of theses is on topics involving systems that manipulate language. These natural language processing (NLP) theses are engineering oriented. Working on this sort of topic requires knowledge in machine learning (taught in CS 181) and statistics, with which you should be equipped with before you start a thesis project in this subject area. The other category of computational linguistics theses is more linguistics oriented, and not as engineering-heavy.

A good example of an engineering-oriented NLP computational linguistics thesis project is *Stylometric features for multiple authorship attribution* by Brian Yu (2019). This project is an extension to existing authorship attribution models that aim to perform authorship classification on documents that may be jointly written by multiple authors. It proposes a model that uses a sentence-level Bayesian classifier to predict the most likely author in the composite document and a Hidden Markov Model-based procedure to estimate section boundaries.

For an example of a more linguistic-oriented computational linguistics thesis project, there’s *Tree Adjoining Grammar at the interfaces* by Nicholas Longenbaugh (2014). This thesis constitutes an exploration of the applications of tree adjoining grammar (TAG) to natural language syntax, using Niuean (an Austronesian language) raising constructions as a case study. This project not only involves the application of TAG, but also includes linguistics fieldwork and syntactic theoretical discussions.

Since both directions in computational linguistics require a great deal of background knowledge that is acquired through taking CS courses, you should be aware of time management and course selection before senior year. Further, CS offers a thesis-writing independent study course, CS 91r, which you may take during one or both terms of your senior year under the supervision of your research advisor. (If you have a clear research topic, you may also choose to take it in the spring of your junior year.) CS

holds an information session for those interested in writing a senior thesis towards the end of each spring semester. Details about the session are posted each year to the cs-undergrads@seas.harvard.edu email list.

An important difference between linguistics and computer science is that advisers from SEAS require the full draft of your thesis a month before the deadline. Therefore, the first draft of your computational linguistics thesis should be ready by the beginning of March. That means the main component of the research should be done by the end of the fall semester. You should be writing throughout and meeting with your adviser regularly to make the progress you need to make to meet this deadline.

Data collection

The research project you undertake for your thesis can involve building systems, or it can involve experiments and measurements, or it can be more theoretical. Some projects do more than one of these things. Depending on your topic and the models you select, the data you need can vary. If you are working on a more linguistic-oriented project, the data and the methodology will align more with the linguistics side. If you are working on an NLP computational linguistics project, you will probably need a corpus for the purpose of training, developing and testing your model. You might need raw texts that are available online or annotated texts such as those in Penn Treebanks. The Linguistic Data Consortium (<https://www ldc.upenn.edu/about>) creates and distributes a wide array of language resources that support different research. Meet with your adviser to discuss the best methodology for answering your research question, and make sure that you have the technical knowledge and CS background to accomplish it.

Data presentation

A computational linguistics thesis includes introducing a problem and the necessary background, then a solution to the problem. Unlike the traditional linguistics thesis, which usually includes a literature review on the problem at the beginning of the thesis, in a computational linguistics thesis, there is not necessarily a discrete literature review section. You may choose either to include a literature review section at the beginning or, instead, to introduce the relevant work wherever it applies.

We strongly recommend that you use LaTeX for thesis writing in this subfield, since LaTeX is the standard for CS theses.

The Structure of the Thesis

One of the most important things to keep in mind when working on your senior thesis is that you shouldn't wait until the end of your project to begin writing. Writing and revision should be a continual process throughout the duration of your senior year. When you begin writing the thesis, you may not yet know what your conclusion is going to be—you might not have run your experiment yet, or you might not have done your analysis. That's ok! The important thing is to begin writing as soon as you can, so that you leave yourself enough time to complete the work.

As we mentioned in section 2, all thesis writers in linguistics (except for joint concentrators) are required to take the Ling 99 series of courses during their senior year. These are the thesis writing workshops, and they're meant to help keep you on track and writing at a good pace. The structure of Ling 99a & 99b breaks up the thesis into manageable chunks with clear due dates, so that the prospect of writing a 50-70 page thesis is not too overwhelming.

A linguistics thesis consists of the following parts:

- Title page
- Acknowledgements (1 page; these are optional)
- Table of contents
- Abstract (1 page)
- Introduction (5-10 pages)
- Literature review (10-15 pages)
- Description of research methodology (5-10 pages)
- Results (10-15 pages)
- Discussion and Analysis (10-15 pages)
- Conclusion (5-10 pages)
- References
- Appendices (if any)

The goal of the thesis, in general, is to make sure that your reader understands the work you've done. You are showing your reader something you've learned, discovered, or accomplished. Clarity should be your main goal, and a clearly delineated thesis structure goes a long way towards ensuring that your reader understands the ideas you're trying to convey.

Each section of the thesis serves a specific purpose in shaping your argument. We'll be discussing some of them below. Formatting for the title page, the acknowledgements, the table of contents, any appendices, and the references will be discussed later, in section 5. This next section is primarily concerned with how to write your abstract and the body of your thesis.

Abstract

The abstract is a one-page synopsis of your work that is meant to quickly tell the reader what you've done. As a piece of writing, it stands alone from the rest of your thesis: it should not allude to anything to come later (e.g., no "I will show below" or "As seen in

section four

Figure 5” when Figure 5 is not itself in the abstract) and should be self-contained and succinct. The reader should be able to understand what the problem under investigation is, what you’ve done, how you did it, what the results are, and why it’s interesting.

To achieve this, you’ll follow a pretty basic formula.

- Identify your research question or questions. What are you asking? Introduce the problem to be solved.
- Situate your research questions in the literature by telling us what the state of the debate on your question is. What do people think about this now? Are there two schools of thought? Don’t get too deeply into many peoples’ arguments; citing a few sources will be fine here.
- Tell us what your claim is. What do you propose as the answer to your research question?
- Tell us how you came to this conclusion—what was your methodology?
- Include a brief section about the implications of your research—how could this research be used to answer other questions?

Remember, your goals are clarity and brevity. It may be easier for you to write the introduction first and then distill it into an abstract. Additionally, you will start writing your introduction and abstract early on in your project, before you have your results—that’s ok! You can come back and add the results later when you rewrite.

Introduction

The introduction to your thesis should be about 5–10 pages long. It will give your reader an idea of what your research is about, what your results are, and why they’re important. Think of this as more space to flesh out what you mentioned in the abstract. Remember, the abstract and the introduction are two distinct pieces, and you shouldn’t assume that somebody who has read the abstract will be reading the introduction, or vice versa. The abstract will be read by people who are deciding whether or not to read your thesis, or those who simply want to get an idea of what you’ve written about without having to read the introduction. The introduction, on the other hand, is of a piece with the rest of the thesis: you can allude to things to come later, on the assumption that the person reading the introduction has the whole thesis in their hands and is willing to read more.

Writing the introduction to your thesis might feel daunting at first. Don’t be intimidated by the blank page—it’s much easier to edit something than to write something from scratch, so get your ideas down on paper as early as you can! Similarly, don’t worry that you don’t have enough information or data to write your introduction—you’ll have a chance to rewrite this several times over before you’re done.

When you write your introduction, you’ve got several goals:

- Define your research question, or questions. What are you trying to answer?
- Show the reader why your research questions are important by briefly citing other research on the topic. What’s the debate surrounding your topic? You can briefly cite certain leading people on various sides of the debate, but leave extended discussion for the literature review.
- Briefly discuss your methodology for answering your question or questions. You shouldn’t go into the nitty-gritty here, but give enough details so that the reader quickly knows what kind of a study this is. Did you do an experiment? Who were

the subjects? Did you do a survey, or analyze recordings, or do interviews? Or is this a more theoretical thesis?

- State your key findings. What's the answer to the question or questions that you pose?
- Briefly talk about some implications for your research—what can be done with this information, now that we know it? What does it tell us?
- Give the reader a roadmap for what you intend to do in the thesis. This tells the reader what to expect and when to expect it, and also serves as a good transition into your next section.

You'll note that almost all of these goals are the same as those for the abstract (except for the roadmap, of course). In some ways, you can treat the introduction as an expanded version of the abstract. You've got more space to say what you want to say here, but you should leave the full discussion of each part for the individual sections.

You'll also note that you've stated your conclusion right at the outset, in the introduction. Writing a linguistics thesis is unlike writing a creative piece, where you can leave the reader in suspense about the ending. A linguistics thesis shouldn't have a 'big reveal' or twist ending. Your goal here is clarity, and readers are better able to follow an argument when they know exactly where it's going. Tell readers exactly what you're planning to tell them; then tell them; then summarize what you told them.

Literature review

The literature review serves two purposes: to acquaint your reader with the state of scholarship around your research question and to demonstrate that you've meaningfully engaged with the literature. You're trying to show the reader where your particular research question fits into the world of linguistic scholarship. For this reason, you'll need to carefully curate what works you choose to include in the literature review—you don't want to waste your precious space (or working time!) on tangential or irrelevant citations.

How you organize your literature review will depend in part on what sort of thesis you're writing, although it's ultimately up to you. If you've done an experiment, you'll want to mention similar experiments that have been done in the past, but you'll also want to mention theoretical reasons for the experiment you've conducted. You may therefore wish to split your literature review into a theoretical section (discussing the potential reasons behind the phenomenon you're exploring) and an experimental section (discussing what experiments have already been done to explore this phenomenon). If you're writing a more theoretical thesis, you could choose to present different schools of thought about your research question, selecting important works from each school.

The important thing is that your literature review has a narrative flow and builds to a point. It shouldn't be a collection of mini book reviews; instead, you're making a case to the reader that your research question is one that needs to be answered and that your methodology is a good way of answering it. For that reason, the end of the literature review should transition into talking about your own thesis. Are you filling a gap in the research? Are you testing out a theory, a model, or a program? Are you providing new data that supports or does not support an existing theory? Moving into a discussion of your own work at the conclusion of the literature review brings the reader back to the main point of the thesis: your research question. It also transitions nicely into your methodology section.

Methodology

This is the place to explain what you did in detail. The methodology section of an experimental thesis will be different from that of a more theoretical thesis. If you're running an experiment, you'll want to spend more time on this section; if you're using data from a corpus, or from existing works, you may want to spend less time here and move on to the results chapter.

If you've run an experiment, you'll want to answer several questions:

- Who are your speakers? How did you recruit them? Identify any relevant information for your question, such as age, gender, or native language.
- When did you do the experiment? If it is a survey, did you do one survey, or multiple surveys? If you're analyzing recordings, how many recording sessions were there?
- How large is your data set? How many speakers do you have?
- How did you conduct your experiment? What equipment did you use? What kind of task did you use? What variables did you measure? What were you looking for?
- How did you analyze your data? What programs did you use?
- Why did you make these choices?

The last question is the most important, and you'll have to answer this alongside other questions that you answer to justify the choices you've made. For example, when you describe the variables you measured in your experiment, you'll want to explain why you chose those variables. When you describe how you analyzed your data, you should explain why you chose that methodology.

Results

Here is where you present your data. You can offer limited discussion of it here, but you should save the discussion for the later discussion section. This section is probably where most of your charts, tables, and other figures will go. The limited discussion of your data should answer a few questions:

- What is the data being presented?
- What is the question this data is trying to answer?
- Why is this data interesting or significant? What does it suggest?

Discussion and analysis

This section is where you interpret the results in-depth. First, re-summarize your main findings. What is it that you've found? Then, interpret your findings. Remember the debate you described in your literature review, or the gap in the research that you said your project would fill? Here's where you show how your findings fill that gap or help to resolve that debate.

Conclusion

Your conclusion will flow naturally from the discussion and analysis section, since you've already begun to engage with the implications of your research. Here in the conclusion, you can go a bit further, and talk about new questions your results pose, potential improvements to your methodology, or any other theoretical implications of your work that you haven't yet mentioned.

Revising and rewriting

Once you've written the first draft of a chapter, it's time to revise. When you first meet with your adviser, one of the most important things to discuss is the number of drafts the adviser is expecting or willing to read, and how much time they require to read a draft and give thoughtful feedback. This will go a long way towards conveying to your adviser that you respect their time; this will also ensure that you know how early to submit drafts before you plan to be able to incorporate feedback. As a general rule, it's a good idea to give your adviser a week minimum to read a draft and comment on it, but this is best discussed with your adviser so that you're both clear about expectations.

Your adviser's main role in giving feedback is to help you shape your argument and ensure that you are presenting your data and argumentation in the clearest way possible. Additionally, they may give feedback on grammatical points or points of formatting. If they choose to do the latter, this is of course helpful to you; however, if they do not wish to give that level of editorial help, the DWF is always available to meet with you and give writing assistance and advice.

In the Ling 99 series of workshops, you and your thesis-writing cohorts will be doing a lot of peer reviewing. Peer review is an excellent way to gain new ideas and a new perspective on your own project, and we encourage you to enlist the help of friends and classmates in reviewing your work as often as you can. Don't just wait for a meeting of Ling 99!

Finishing Up

Formatting basics

There are a number of pieces of your thesis that require very specific formatting. This section will first go over general formatting, and then will tackle the specifics of the title page, acknowledgements, and references.

General formatting

The following rules in general are similar to those for the journal *Language*, although there are a few differences. For all other formatting issues, consult the style guide for *Language*, which may be found on the department's website: http://linguistics.fas.harvard.edu/files/linguistics/files/language_journal_style_sheet.pdf.

Spacing: Double-spaced throughout, with spacing in between sections (This differs from the guidelines in *Language*, which uses 1.5 spacing). Start new chapters on new pages. Use a single space after a period.

Font: 12 point throughout, serif font (preferably Times New Roman).

Margins: 1 inch on the right, top, and bottom; 1.5 inches on the left. (This differs from the *Language* rules and has to do with the binding process for summa and magna theses. If you receive a summa or magna grade and therefore must submit a printed copy to the department, your margins, and therefore your pagination, should be ready to go.)

Alignment: Left-aligned.

Numbering: Upper right-hand corner, beginning with the first page of the introduction.

Notes: Footnotes, rather than endnotes. (This differs from the *Language* rules.) Number your footnotes serially—don't start over with each new chapter. Use footnotes sparingly. If it's important to your argument, you should consider including it in the text; if not, consider omitting it.

Brackets and quotes: Phonetic transcriptions should be in square brackets [], phonemic transcriptions within slashes //. Direct quotes belong in double quotation marks:

As Lee notes, "This is an agglutinative language" (1999:21).

In-text glosses belong in single quotes:

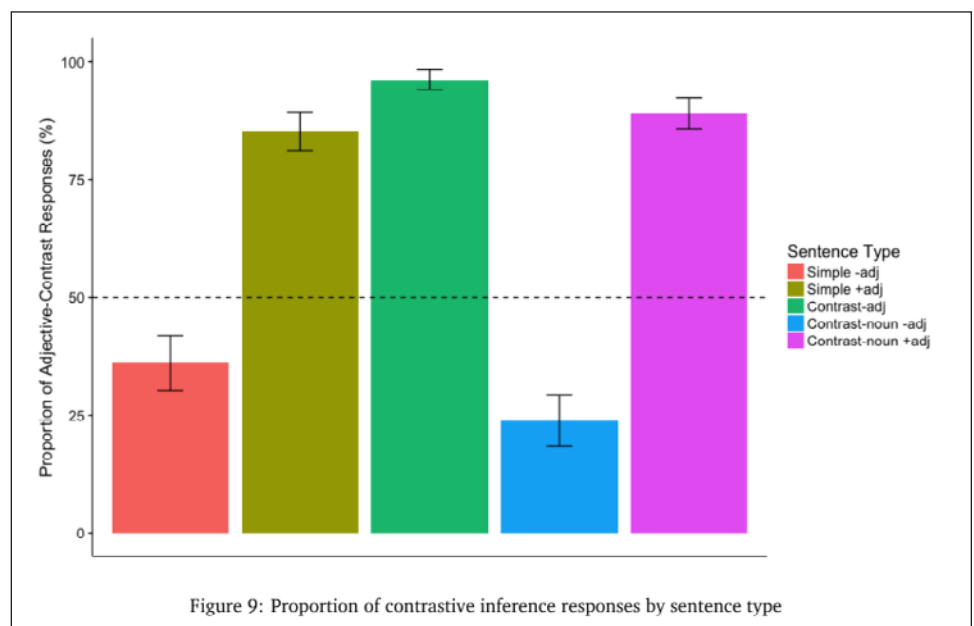
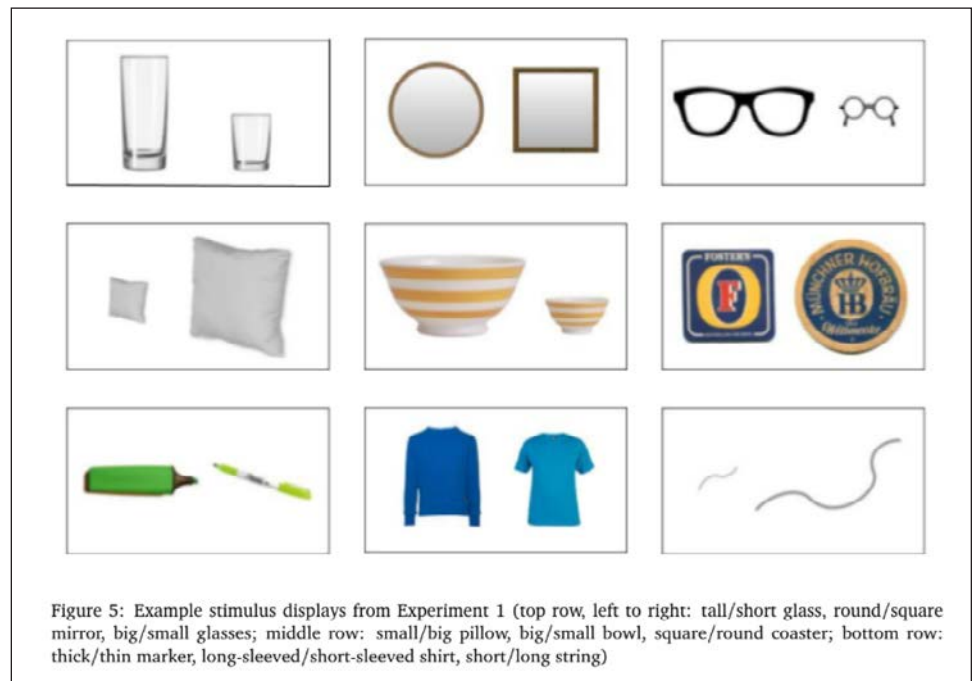
Latin *ovis* 'sheep' is a noun.

Section five

Tables, graphs, and figures: When you introduce a table, graph, or figure, it should be labeled with a descriptive caption. (Note that the descriptive caption is different from the explanatory paragraph of text that you'll include as part of the prose of your thesis.)

Condition	Focus	Adjective	Utterance
1	Noun	Thick	Thick [book] _F
2	Noun	Thin	Thin [book] _F
3	Adjective	Thick	[Thick] _F book
4	Adjective	Thin	[Thin] _F book

Table 1: The four experimental conditions of stimulus item Book



[From Alsop, Anna. 2018. An experimental investigation of modification and pragmatic contrast in English and Japanese. Unpublished Harvard College honors thesis. 16-17; 25.]

Number these serially—don't start over with each new chapter. Tables, figures, and charts should be numbered separately from one another.

Citations: When citing a work within the text, you need to give the author's surname, the date of publication, and the page number. How much of that goes in parentheses depends on the context. If the citation is of the work only, place everything in parentheses:

Either form can surface in this context (Smith and Jones 2012:34).

However, if the author's name is part of the text, just put the date and page number in parentheses:

Smith and Jones have demonstrated that either form can surface in this context (2012:34).

Title page

Your title page should be formatted like the following sample title page:

TITLE OF A LINGUISTICS THESIS

by
Your Full Name

presented to the Department of Linguistics
[and the Department of Your Secondary Concentration]
in partial fulfillment of the requirements
for the degree with honors
of Bachelor of Arts

Harvard College
Month 20XX

If you are a joint concentrator and linguistics is your secondary concentration, the department of your primary concentration should be listed first, followed by linguistics.

Acknowledgments

You may choose to include some brief acknowledgements, usually no more than a short paragraph. This stands alone on its own page between the title page and table of contents.

Appendices

If you've conducted a survey and used a questionnaire or similar materials, you'll want to include the complete set of questions or prompts that you used in an appendix. There's no need to provide explanatory prose here, since you'll have already talked about your methodology and data in the appropriate sections. This appendix is just for your readers' reference, in case they'd like to see the complete set of materials you used.

References

Language essentially uses the APA's citation format, and you should therefore use APA style in your references section. References should begin on a separate page from the final chapter, and should be cumulative—you should not do an individual references section for each chapter.

Submitting your thesis

You are required to send a pdf of your thesis to the instructor of Ling 99, the DUS, and the DWF by noon (12 p.m.) on the Friday before the spring recess. No hard copy is required for this deadline. After the thesis has been graded, if you have received a grade of summa or magna, you'll need to print it out on acid-free, alkaline-buffered, durable 8 ½" × 11" paper and give an unbound copy to the AHT.

Readers

Your thesis will be graded by three readers, one of whom will be your adviser. The other two readers are chosen by the department and will be anonymous to you. If you are a joint concentrator, some of your readers will be from your other department. The selection of readers is an administrative matter, and shouldn't be a worry of yours; however, if you have any questions about readers, or if you are a joint concentrator and your other department has questions about readers in linguistics, speak with the DUS.

The thesis colloquium

The Linguistics Department traditionally hosts a senior thesis colloquium every year at the conclusion of the spring semester. During the colloquium, which anyone is welcome to attend, seniors present their theses and take questions from the audience about their research. You will have 20 minutes to present your work and 10 for questions and discussion. The thesis colloquium is mandatory; however, your presentation at the colloquium doesn't factor into the assessment of your thesis in any way. If you like, you can think of the colloquium as the culmination of the Ling 99 writing workshop. It's a way to hear about everyone else's work, and it's an experience similar to that at an academic conference.

Appendix

Glossing rules

Spoken languages

When giving an example from a spoken language other than English, a three-line presentation of it is required. The first line presents the data from the target language, written either in IPA or using the spelling/transliteration conventions of that language. On the second line, word-by-word glosses (or morpheme-by-morpheme glosses, when relevant) provide information about the meaning and grammatical properties of each word (or morpheme). Abbreviations that you use in your glosses should be defined either at the beginning or at the end of your thesis. Finally, on the third line, you should give an idiomatic full-sentence translation. Examples involving word-by-word glosses and morpheme-by-morpheme glosses are provided in (9) and (10) respectively.

- (9) Est-ce que ces étudiants écriront une thèse? *French*
is-it that these students write.FUT a thesis
'Will these students write a thesis?'
- (10) Gila abur-u-n ferma hamišaluğ güğüina amuq'-da-č. *Lezgian*
now they-OBL-GEN farm forever behind stay-FUT-NEG
'Now their farm will not stay behind forever.'

[From Haspelmath, Martin. 1993. *A grammar of Lezgian*. Berlin: Mouton de Gruyter. 207.]

As shown above, there is no spacing between the lines of an individual example, but examples are preceded and followed by spacing. Spacing is modified to single-spaced or 1.5 between lines of an example, but reverts to double outside of it. If you can, avoid placing examples and their respective glosses on different pages.

When linguistic data are provided within the text, they should be presented in italics, followed by a gloss in single quotes: for instance, *thèse* 'thesis.' Similarly, when the pronunciation is relevant and you are providing an IPA transcription, it should also be followed by a gloss in single quotes: for instance, [tɛz] 'thesis.'

When transcribing data, we recommend that you refer to the **Leipzig Glossing Rules**. The purpose of these rules is to make the most widely used conventions explicit. They have been developed by the Department of Linguistics of the Max Planck Institute for Evolutionary Anthropology (Bernard Comrie, Martin Haspelmath) and by the Department of Linguistics of the University of Leipzig (Balthasar Bickel). You can find them here: <https://www.eva.mpg.de/lingua/resources/glossing-rules.php>.

Sign languages

The above conventions mainly concern spoken languages. However, perhaps you are writing a thesis about a sign language, or you'd like to mention a particularly relevant example in a sign language. There is not a single unified way to gloss sign languages. The way you gloss your examples will mainly depend on your research question: the focus of your investigation will determine what kinds of details you choose to include. For

instance, if you are interested in non-manual marking, you will be coding more non-manual markers than if that's not your focus. You and your adviser can work out the best way to gloss your examples and highlight the points you'd like to include.

A two-line presentation of examples is generally provided for transcribed sign languages. On the first line, manual signs are written in capital letters using rough English glosses, and the presence of simultaneous non-manual marking is noted above the glosses with a line. The extension of the line indicates the duration of the non-manual marker. On the right side of the line, the type of the non-manual marker is noted in superscript. The second line provides an idiomatic translation of the sentence. This is illustrated for American Sign Language (ASL) below. As you can see, when signing an interrogative clause like (11), the signer has her eyebrows raised. This is transcribed as in (11) with the brow-raise non-manual marker throughout.

(11) ZOE PLAY VIDEO – GAMES^{brow-raise ?} ASL
'Does Zoe play video games?'



[From Gonzalez, Aureore, Kate Henninger, and Kathryn Davidson. Forthcoming. Answering negative questions in American Sign Language. *Proceedings of NELS 49*.]

Including as many pictures, figures, and/or stable links to video as possible is good practice for sign language linguistics.

Advising form

_____ agrees to advise _____'s

senior thesis on the topic _____.

Faculty adviser's signature: _____ Date: _____

Student's signature: _____ Date: _____

DUS' signature: _____ Date: _____

IRB (Institutional Review Board)

Most research involving human subjects requires IRB approval. This includes research conducted using interviews, questionnaires, and the creation of audio or video recordings. Consult with your adviser to determine whether your project requires IRB approval. The Undergraduate Research Training Program (URTP) portal may also be helpful for determining the requirements for your project, and you can find that here: <https://cuhs.harvard.edu/urtp-portal>. The URTP contains training sessions in research ethics and an online decision form that will help you determine whether or not you require IRB approval. If it does, you'll need to go through the steps outlined below.

What is the IRB?

A type of committee used in research in the United States that has been formally designated to approve, monitor, and review (among other things) behavioral studies.

What does IRB approval involve?

You will need to submit an application to the IRB in which you describe your project. An IRB application typically includes a protocol (a cover form describing your research question, experimental procedure, planned subject recruitment method and compensation, data storage practices, etc.), (a) consent form(s), and a sample questionnaire.

Before submitting your application, you will have to either complete an in-person training offered by URTP or the online CITI training, which can be found here: <https://www.citiprogram.org/?pageID=668>.

Once submitted, the IRB will review your application. To have your application approved, you may have to wait several weeks and modifications may be requested. Therefore, you'll want to submit your IRB application several weeks before you plan collecting your data or running your experiment. Remember that you cannot start collecting any data before your project is approved by the IRB!

How to apply for IRB approval

- Complete an in-person training offered by URTP or the online CITI training.
- Read the Study Submission Guide here: http://estrsupport.fss.harvard.edu/files/estr/files/harvard_-_study_submission_guide.pdf.
- Download the forms here: <http://cuhs.harvard.edu/forms>.
- Go to <https://irb.harvard.edu/> to create a new study.

Funding sources

If you decide to conduct experimental work, you may need some research funding. You should start thinking about this ahead of time, as some funding applications will be due in the spring semester of your junior year for projects that will begin in the fall.

One place where you can search for funding opportunities is the website of CARAT (Centralized Application for Research and Travel), found at <https://carat.fas.harvard.edu/>.

Common sources for undergraduate research support are the Harvard College Research Program, the Herchel Smith Fellowship, and the Faculty Aide Program, and these all use the CARAT general application. These vary in size and competitiveness, but depending on what kind of research you intend to conduct, may be helpful. Additionally, if you plan ahead with your adviser, programs such as BLISS and PRISE are

excellent summer research options. Information about both of these may be found here: <https://uraf.harvard.edu/summer-residential-research-programs>. Speak to your adviser about the best fit for you and your project.

End Matter

Abbreviations:

AHT: Assistant Head Tutor

APA: American Psychological Association. This abbreviation can also refer to the citation guidelines in their style manual.

ASL: American Sign Language

CARAT: Centralized Application for Research and Travel

CS: Computer science

DUS: Director of Undergraduate Studies (sometimes also known as the Head Tutor)

DWF: Departmental Writing Fellow

IRB: Institutional Review Board

OT: Optimality Theory

URTP: Undergraduate Research Training Program

Glossing abbreviations used in examples:

FC: free choice

FUT: future

GEN: genitive

NEG: negation

OBL: oblique

SG: singular

SUB: subjunctive

This guide was prepared by Aurore Gonzalez, Yuyin He, and Julia Sturm (graduate students in linguistics), with input from faculty and administration in linguistics, computer science, and psychology. The writers would like to thank the Harvard Writing Project for supporting and funding this endeavor. We would especially like to thank James Heron of the HWP, who provided editorial support and guidance throughout the writing of this manual.

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end matter

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