

The Senior Thesis Experience
Department of Psychology
Haverford College
2011-2012

It is now your senior year and you face one of the most important requirements of the major: the senior thesis. This project is an in-depth investigation of an issue that requires an integration and application of course material and methodological skills acquired in previous courses. We have found that this experience uniquely prepares our students for graduate school and various types of psychology-related jobs after graduation. Few institutions provide this sort of research experience to their undergraduates, so our students often have an advantage in both graduate school admissions (and the coursework required after admission) as well as the job market available to BA's. Several alumni have found that senior research is relevant to fields seemingly unrelated to psychology, including those of business and law. We hope that you do not view the senior thesis project as an ordeal, but rather as an opportunity to further develop your knowledge and skills.

I. Overview of the Thesis Experience

A. One vs. Two Semester Theses

The psychology thesis project can assume one of two formats. The typical route, followed by the majority of students, is the two-semester empirical project. In this format, a student (or more typically, a group of 2-4 students) selects an empirical question and does the relevant background reading; writes a literature review and research proposal; designs and conducts an experiment to collect original data; and, after performing the statistical analyses, writes a paper that describes their research and conclusions.

An alternative option is a one-semester, non-empirical project that may be appropriate in some circumstances. In the one-semester project, a student conducts an in-depth literature review of given topic along with his or her own original synthesis and analysis of the issues, and submits a paper that relates this work. In addition, the student must complete an extra 1-credit, advanced course from one of the 3 sub-areas of the major (biological, cognitive, social/personality). This thesis format is not recommended for most students because it doesn't provide the type of intensive research experience that the thesis is intended to provide and that graduate programs consider valuable. However, it may be appropriate for students who have a deep interest in researching a topic that is not amenable to the empirical methods required in the typical two-semester thesis project.

B. First and Second Readers

Regardless of which thesis option you select, you will have both a first and second reader who supervise the thesis project. The first reader is the primary faculty member with whom you will work. You will meet with your first reader on a regular basis (typically every week) to discuss the background reading, study design, and so on. The second reader plays a less active role, but is nevertheless available to discuss theoretical issues, design and methodological concerns, the appropriateness of certain statistical procedures, and any other issue that may arise. Because the second reader helps to determine your thesis grade for the first and second semester, it is important that you periodically meet with this person so that he or she is informed about your project and has no later misunderstandings. You will be assigned a second reader in the early fall, once first readers have been established.

Some students in the past have asked why a second reader is necessary. Because the second reader comes from a different area of expertise than your primary advisor, he or she is able to provide an alternative perspective that may significantly enrich your overall project. For example, the second reader may know of other readings that are relevant to your background literature review, other factors that should be considered in your experimental design, or alternative techniques of data analysis. It is often easy to develop a particular mind-set on a topic that prevents one from considering other possibilities; one way to avoid this problem is obtaining a second opinion. Beyond this, the inclusion of second readers ensures that the overall grading process is more fair, because each faculty member reads a wide range of theses (both as a first and second reader). Therefore, the relative comparison between all students can better be determined. Finally, the fact that the second reader is not an expert in the thesis area forces you to communicate your ideas and procedures clearly enough to be understood by someone outside of the area of expertise.

C. Off Campus Advisors

Faculty members at other schools can serve as primary project advisors in some circumstances. In prior years, students have worked with advisers at Bryn Mawr or Penn, for example. Regardless of where the work is done, the form and scope of the research project must conform to the Haverford model, as outlined in this document. If you work with an off-campus advisor, a member of the Haverford department will serve as your second reader, and this person will have the primary responsibility of evaluating your work, in consultation with the off-campus advisor. It is very important to have regular meetings with the Haverford advisor to be sure that you are meeting the thesis requirements.

D. Determination of Grades

The thesis grade for each semester is based on two main components: the strength of your paper and your contribution to the thesis project. The paper is evaluated on a number of criteria, including the thoroughness of the background literature review, its overall organization, accuracy, style, your own creative input, your ability to integrate different ideas in a novel and cogent fashion and finally, whether your arguments and conclusions are persuasive given the issues at hand. Each student is expected to hand in an individual paper, even if he or she is working as part of a thesis group.

In addition to the paper, we also evaluate your degree of active involvement in the senior thesis experience. During the fall semester, we consider the extent to which you help shape the study questions, design, and methodology of your project. During the spring, we consider the effort expended in the data collection and analysis phases of your study, and your contribution to project presentations and the final poster. Although the paper is weighted more heavily than the project contribution in arriving at the final course grade, it is possible to write an excellent paper but receive a significantly lower grade due to insufficient involvement with the project.

Both your first and second readers will evaluate your work based on the above criteria. Final grades are determined by a consensus process involving all department members, who will discuss your performance and compare it with other students, both past and present, in order to arrive at a fair evaluation of your work.

You may find it useful to know what information we weigh in grading the first semester paper:

- ❖ 4.0 work for the first semester indicates a paper that has gone above and beyond a summary of the relevant literature in terms of scope, synthesis and integration. In addition to reflecting a nearly flawless paper that provides a coherent rationale for the experiment to be undertaken, this grade can also represent exceptional or original independent contributions, or individual effort that has gone beyond what is normally expected. A grade of 4.0 is not commonly awarded during the first semester.
- ❖ 3.7 work for the first semester indicates an extremely thorough, coherently organized, and generally well-written summary of the literature that identifies all of the seminal work that has led up to the current study. In addition, this grade reflects that the rationale for the current study is abundantly clear and the procedures to be used are well-described. There may be improvements that can be made to this paper, but there are no major areas of deficiency.

- ❖ A grade of 3.3 for the first semester reflects a good to very good paper that needs improvement in one or more areas. The literature review may need to be more thorough, or the literature better summarized or integrated. The writing may be choppy or difficult to follow in some areas. There may be conceptual gaps that lead to an incomplete rationale for the study to be undertaken.
- ❖ 3.0 work for the first semester indicates that although the paper is good, there are several areas in which improvement can be made. For example, the literature review may have been too scant or poorly integrated. That is, the paper may have included summaries of appropriate studies without integrating how those studies support an important point or how they relate to the study that you are undertaking. The literature review may not have been thorough enough or may have relied too heavily on non-primary sources. In general, the reader may have had a difficult time understanding how the literature review culminates in the problem to be addressed in the current study.
- ❖ A grade less than 3.0 for the first semester work indicates that the paper is deficient in terms of our expectations for thesis-caliber work.

In grading the second semester paper, we evaluate the following:

- ❖ Does the introduction provide the necessary background and rationale for the project, including clearly stated hypotheses and goals for the research? Have any recommended improvements to the introduction been addressed?
- ❖ Does the paper include an informative and concise abstract?
- ❖ Does the methods section accurately and thoroughly describe the procedures carried out in the project?
- ❖ Is the results section well-organized and thorough? Are appropriate statistical tests applied, and does your reporting of the results of those tests indicate that you understand what they mean? Is the purpose or aim of each statistical test made clear? Have you presented all necessary data in tables or figures? Is the results section reasonably easy for a reader to follow, even a reader who is not intimately familiar with your project?
- ❖ In the discussion section, have you clearly interpreted your results in relation to the hypotheses or questions that your research was intended to address? Have you related your results to other findings in the literature, to provide scholarly context for your findings? Have you acknowledged limitations of your research and considered alternative explanations? Have you made logical and constructive suggestions for future research? Does the discussion section demonstrate originality or novel insights in some way? Does the reader know what to take away from the study in the end?
- ❖ Throughout the paper, is the writing polished, professional, and scholarly?

E. Attendance at Talks by Outside Visitors

As a senior psychology major, you should display curiosity in learning about the field outside of the classroom. One part of this engagement involves attending talks given by outside speakers. From time to time, the department brings distinguished researchers in various areas of psychology to give talks and to meet with students. These visits give you the opportunity to learn about current issues in the field and to make direct contact with interesting people. You are expected to attend all public talks given by visitors; we do take note of who attends. There will be enough advance notice given so that you should be able to adjust your schedule to make room for attendance at the talks. Details about this year's visitors will be provided later.

II. Time Table of Activities

As noted in the course guide, the senior thesis course is scheduled for Friday afternoon from 1:30 to 4:00 pm. Although we do not plan to meet often during the Friday slot, we expect you to be available during that time during the fall semester. Therefore, we would appreciate it if you do not schedule classes during this Friday time slot.

This section provides an outline of the sequence of activities involved in completing a two-semester project. Below we also provide important due dates.

Students who complete a one-semester project are subject to the deadlines for the first and final thesis drafts in the semester in which they complete their project. Regardless of the semester in which they complete their papers, one-semester thesis students are not expected to give a presentation in the fall semester, but they are expected to give a presentation at the end of the spring semester, along with presentations given by two-semester thesis students. One-semester thesis students are not expected to submit a poster.

A. Fall Semester Timeline

Sept. - Oct.: During the first two weeks of classes, you will be matched with a faculty advisor and thesis project, based on your preferences and the availability of the faculty member. The remainder of the month, along with the month of October, will be spent reading background literature and meeting (usually once a week) with your group to discuss the readings and develop a focused research question.

By late October, the particular topic or issue you are investigating should be well-focused, so that your group is able to begin developing a research design that

addresses the question(s) of interest. You will continue to refine this design over the course of the next few weeks. (Remember, you should discuss this with your second reader as well.) During early November, you should also begin to work on your paper, which is due near the end of the semester.

Please mark these important dates on your calendar:

Fri. Nov. 4 and Fri. Nov. 11: Oral Presentations.

Note that *all seniors are expected to attend these presentations.*

During the scheduled course time (Friday, 1:30 -- 4:00 pm), each thesis group will present their project orally to the other senior students and faculty members. This gathering is traditionally a relaxed and friendly one; its main purpose is simply to share with the rest of us what your thesis project is about. Given that each group will be allotted a 20-minute time slot, you'll probably want to spend a few minutes giving a brief summary of the relevant background literature from which your question stems and how the particular issue you're investigating extends what has been done before. Be sure to make clear what central hypothesis or question you are testing. You should then provide an overview of the research design you will be using as well as the set of predicted results. There will be a few minutes left open for questions and discussion. Each group member is expected to participate in the oral presentation, so try to divide your talk up in an equitable fashion. PowerPoint format is usually expected.

Wed. Nov. 23: First Draft of Thesis Due.

Turn the first draft in to your primary adviser only (not the second reader). Your advisor will return the paper to you with comments by Dec. 5 at the latest.

Mon. Dec. 12: Final Draft of Thesis Due.

Turn in two copies of the final draft, one to the first reader and one to the second reader.

These deadlines are non-negotiable. No extensions will be given, except for documented medical reasons or catastrophic personal trauma. Papers turned in after the due date will be penalized by one grade step for each day of lateness.

B. Spring Semester Timeline

Jan. - Feb.: Although students are encouraged to begin the setup of their experiment and the development of stimulus materials, apparatus, etc. at the end of the first semester, much of this work will probably be done during January and February. Before you begin the actual data collection, it may be useful to run a pilot study to ensure that all methodological concerns have been addressed. We also recommend that you consult with your second reader about your precise methodology before beginning to run your experiment.

In addition to setting up your experiment, it is also a good idea to use the beginning of the semester to polish and refine both the Introduction and Method sections of your thesis. If you do this now, you'll be less stressed during the latter part of the semester when you will have new sections to write.

Feb. – Mar.: During the middle and end of February, you should begin to collect data, a process that will continue through most of March.

Mar. – Apr.: At the end of March and the beginning of April, you will be analyzing your data and considering how your results relate to the hypotheses that you outlined in the introduction of your paper.

Fri. Apr. 13: First Draft of Thesis Due.

Turn the first draft in to your primary adviser only (not the second reader). Your advisor will return the paper to you with comments by April 20 at the latest.

Fri. April 27: Final Draft of Thesis Due.

Turn in two copies of the final draft, one to the first reader and one to the second reader.

Wed. May 2 & Thurs. May 3: Oral Presentations.

Each thesis group is expected to present their project orally. On these two scheduled dates (typically lunch meetings from about 11:30 - 2:00), we will meet in a reserved room at the Dining Center for a "mini-conference", modeled after a professional psychology conference. During these sessions, each thesis group will give an oral presentation of their project during an allotted time period (usually 20 minutes). Each student is expected to participate in this presentation. We recommend that you use PowerPoint to present your project; other audio-visual aids are also encouraged where appropriate. The junior class of psychology majors will be invited as guests. *It is mandatory that all senior students attend this conference on both days.* Failure to attend the presentation sessions will result in a reduction of your thesis grade.

Fri. May 4: Posters Due.

Each thesis group will create a poster describing the objectives, methods, main results and conclusions of the study. These posters will be displayed on the 4th floor of Sharpless, and can serve as inspiration for the next class of students in the coming year.

When you have created your poster, the INSC secretaries can help you to print it; email them at kinsc@haverford.edu.

Once again, *these are non-negotiable deadlines.* Work turned in after the due date will be subject to a grade reduction.

III. Format of Thesis Paper

A. Fall Semester Paper

Your first semester thesis will consist of three major sections, which together should not total more than about 35 pages:

1. Introduction

After an initial paragraph that provides an overview of your question of interest, you should present the background literature along with reviews of the theoretical positions and empirical studies that provide the basis for your research. This is the central part of the first semester paper. It allows you to demonstrate your understanding of the relation between your research question and central issues in your area of psychology. The particular question you're investigating is then introduced in a way that makes it clear how it extends the previous research. The development of the background should point clearly to the need for the study you propose.

The background should include a clear, conceptual or theoretical description of the variables you intend to study and the questions you intend to ask about the relations among them. You may or may not have specific hypotheses about how all the variables are related, but you will always have focused questions that motivate your project. The background section should conclude with a brief overview of your project and, where relevant, the results that you predict.

2. Method

This section describes how you will measure and/or manipulate the variables you described in the Introduction and how you will answer the questions or test the hypotheses addressed by your study. A typical Method sections consists of subsections such as Design, Participants, Stimulus Materials, Apparatus, and Procedure. The specific organization will depend, of course, on the type of study that you are conducting. In general, the Method section should include as much detail as possible to demonstrate that you have designed a feasible, well-planned study with a sound experimental design.

3. References

This is a listing of the references that are cited in your thesis. The reference list should be in APA format. Please consult the APA manual (in the lounge, room 402) for the correct format.

Before writing your paper, it is often helpful to develop a detailed outline of the relevant issues you'll be discussing in your thesis. This often helps you to integrate your ideas into a coherent whole and gives you an overall perspective on the topic you're investigating. This process of organization can be especially helpful as you've just finished an intensive, piecemeal reading of the background literature. In addition, by showing the outline to both your first and second readers, you can ensure that the proposed content and organization of your thesis is acceptable before you start writing.

In order to give you an idea of how your final draft should look, we will put several first semester papers from previous years (which all received a high grade) in the psychology lounge. You are welcome to look at these as much as you would like, but please do not remove them from the lounge area.

B. Spring Semester Paper

Your spring semester paper will include some revised material from your fall paper (introduction, methods, and references), as well as new sections (abstract, results, discussion). The introduction and methods sections from your fall paper should be revised to address any feedback that you received on the fall paper from your first and second readers. The methods section may also need revision if you changed your procedure or worked out additional methodological details since your fall semester paper.

In addition, your spring semester paper will include the following new sections:

1. Abstract

Your paper should begin with a one-paragraph summary of your paper (100-150 words). The first sentence should state the purpose of your project or the primary issue you investigated. Following this, provide a sentence or two each on the overall methodology and findings of your study. The final sentence should relate your conclusions or the general theme of the discussion.

The abstract is usually written after you finish the rest of the paper, even though it is the first section that the reader encounters. The idea is to write a paragraph that will tell potential readers enough about what you did to help them decide whether your paper is relevant to their interests. It also helps someone who has already read your paper to recall what it was about.

2. Results

The results section follows your introduction and methods sections. Remember that the purpose of the results section is to provide the data that will enable you to answer the questions and hypotheses that motivated the study. You should

organize the section to make as clear as possible the relevance of the data to the questions discussed in the background section. A common problem in student papers is that the results are organized too much around certain statistical tests rather than the relevance of findings to the initial set of hypotheses. Be sure to provide some context about the purpose of the statistical tests in relation to the overall aims of the study, so that your reader is not just wading through a list statistics and numerical results.

The usual data presentation is divided into sub-sections, one per hypothesis or study question. The exact organization of your results section will depend on the type of data that you have collected. In general, all the results and tests relevant to a given theoretical question should be presented together. Results must be both described and evaluated. Tables of means, etc. or graphs describe your findings; statistical tests evaluate them. Some researchers begin each subsection with information about the statistical tests and then describe the relevant findings; others use the reverse order. You can use either approach.

Normally, you report specific statistical results by first stating the statistical test that was used (i.e. ANOVA, regression, chi square, correlation) and whether this overall analysis was significant. If the overall analysis was an ANOVA involving more than a simple comparison of two means, you should present the relevant post-hoc analysis. It is likely you will have several significant effects (e.g. several significant F ratios for main effects and interactions); if this is the case, then present your theoretically most important results first. Follow this with the less important effects. In all cases, be sure to discuss the nature of the group differences as well as their statistical significance. At the end of the results, it is useful to provide a very brief summary of what you found.

The format for presenting the results of commonly used statistical tests is as follows:

ANOVA: $F(2,120) = 13.48, p < .001$, where (2,120) refers to df

Chi Square: $\chi^2(2) = 21.22, p < .01$, where (2) refers to df

Correlation: $r = .89, p < .01$

Regression: $R^2 = .25, \beta = 0.373, p < .01$

The tables or figures that depict the results can be pasted into the text or placed on separate pages after the References section. Data pertaining to a given finding should be reported in a table or figure, but not both. Tables and figures should conform to APA style (see the manual). Make sure that your figures have clear captions. Please do not simply cut and paste tables from your statistical output (e.g., SPSS printouts), because such tables typically do not conform to APA style. Your advisor can help if you have any questions about the proper way to report your data analysis and findings.

3. Discussion

The Discussion presents the implications of the results for the study questions and hypotheses. It is where you answer the questions or evaluate the hypotheses that inspired the study. In contrast to the Introduction, it is usually organized from specifics to generals. That is, begin by discussing what you found relative to the set of original hypotheses. Then discuss how your findings extend the previous literature and what their meaning is in relation to broader theoretical issues.

Even when your results support your hypotheses, you should try to think about alternative explanations and discuss why these alternatives do not explain the data as well as the interpretation that you favor. Sometimes some additional data or background research may be described here if they are relevant to judging the appropriateness of the alternative explanations. In addition, the discussion section should acknowledge limitations of your study. The discussion normally concludes by presenting ideas for future research.

4. Appendix

This section of your thesis can contain supporting material, where appropriate. Such supporting material might include copies of instructions to subjects, materials such as surveys, or descriptions of scoring criteria. Your advisor may also wish to retain a copy of the raw data in either paper or electronic form. Please consult with your advisor to determine what supplementary materials he or she expects in the Appendix.

IV. Concluding Remarks

After reading through all this information, you may feel somewhat intimidated. Don't be! The thesis project is divided up into a series of manageable stages and your adviser is there to guide you through these stages. You can avoid a lot of stress by simply planning ahead and anticipating the upcoming deadlines. With rare exceptions, all seniors are able to meet these various deadlines and, in the process, discover they are capable of doing high quality work. Remember that we are here to work closely with you. If you have any problems at all, come and talk to us so we can work on resolving them.