

**The Senior Thesis Experience
Department of Psychology
Haverford College**

Fall, 2007

It is now your senior year and you face one of the most important requirements of the major, namely, the Senior Thesis. This project is important because it is an in-depth investigation of an issue that requires an integration and application of course material and methodological skills acquired in previous courses. Although it is not always appreciated as such at the time, 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, and 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. In addition, several of our alumni have found that senior research is relevant to fields unrelated to psychology, including those of business and law. We hope that you do not view the Senior Thesis Project as a negative ordeal, but an experience from which you can learn and later put to use.

One vs. Two Semester Theses

In the Psychology Department, the thesis project can assume one of two formats. The first is a One Semester, non-empirical Project that is only recommended in certain extenuating circumstances. Here, a student conducts an in-depth literature review of given topic along with their own analysis of the issues at hand, and subsequently submits a paper that relates this work. In addition, a student must complete an extra 1 credit, advanced course from one of the 3 sub-areas (Biological, Cognitive, Complex Human Behavior). This format is not recommended for most students because it doesn't provide the type of research experience the thesis is intended to provide (and that graduate programs consider valuable).

The more typical route the majority of our students follow 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; write a literature review and research proposal, designs and conducts an experiment; and, after performing the statistical analyses, writes a paper that describes their research and conclusions.

First and Second Readers

Regardless of which format is selected, each student has both a first and second reader who supervise the thesis project. The first reader, who is the primary person you're working with, is the faculty member you will be meeting with on a regular, weekly basis (sometimes more frequently) to discuss the background reading, study design, and so on. The second reader (who will be assigned to you in the early fall) 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. In fact, given that 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/she is kept abreast of your project and has no later misunderstandings.

Some students in the past have asked why a second reader is necessary. This person performs several important roles. Since 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 and 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 a more fair one because given that each faculty member has read a wide range of theses (both as a first and second reader), 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.

Off Campus Advisors

Faculty members at other schools can serve as primary project advisors. In prior years, students have often 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.

The 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 ones that "make sense" 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 a near flawless paper that provides a coherent rationale for the experiment to be undertaken, this grade can also represent exceptional and/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 taken.

- ❖ 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 extent to which your paper has improved and addressed any problems identified in your first semester thesis, as well as evaluating the scholarship of the Results and Discussion sections.

Attendance at Talks by Outside Visitors

As a senior psychology major, we expect you to go beyond the level of engagement with psychology that you are used to in regular courses, and to 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.

Time Table of Activities

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

Because most students do opt to enroll for the two semester, empirical project, we have given you an outline for the sequence of activities involved in actually doing your thesis project. In addition, we've also given

you a rough timetable for when these different activities typically occur within a semester.

Semester One

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 doing a background literature review and meeting, once or twice a week, with your group to discuss the relevant set of readings.

By late October or early November, the particular topic or issue you are investigating should be well-focused such that your group is able to begin developing a research design that addresses the question(s) of interest. This design will probably continue to change and refine itself over the course of the next few weeks. (Remember, it is necessary to discuss this with your second reader.) During early November, you should also begin to work on your paper that is due near the end of the semester.

There are four important dates that you should mark on your calendar:

Nov. 9 Oral Presentation From Each Thesis Group

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 min. time slot, you'll probably want to spend 10 min. or so giving us 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. You should then provide an overview of the research design you will be using as well as the set of predicted results (in the case of hypothesis testing studies) or the set of possible results relevant to the questions addressed by your study. The final 5 min. of your allotted time should be left open for questions or group discussion.

Each group member is expected to say something during the presentation and so try to divide your talk up in an equitable fashion. You may find a Powerpoint format is most suitable, discuss with your advisor the appropriate format for your presentation.

Lastly, you should note that all seniors are expected to attend these presentations. We factor in your attendance as part of the project grade and so it is important that you show up on these particular dates.

Nov. 21: First Draft of Thesis Due (faculty will return it with comments by Dec. 3)

Dec. 10: Final Draft of Thesis Due

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

I. Introduction

After an initial paragraph that relates your question of interest, the background literature is presented 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 the variables are related, but you will always have questions. The background should conclude with a brief overview of your project and, where relevant, the results you predict.

II. 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. It normally consists of the subsections of: Design, Subjects; Stimulus Materials; Apparatus; and Procedure. (Some projects may not have a Design, Apparatus, or Stimulus Materials -- this should be discussed with your advisor.)

III. References

This is a listing of those references, conforming to APA format, that are cited in your thesis. Please consult the APA manual (in the lounge, room 402) for the correct format for references.

Before writing your paper (which, again, you should start in early November), it is often helpful to develop a detailed outline of the relevant issues you'll be discussing in your thesis, in the proposed order they will be presented. This, in turn, often helps you to integrate your ideas into a coherent whole and gives you an overall perspective on the topic you're investigating (which is often necessary at this point since 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 an acceptable one before you start writing.

The first draft of your thesis will be due on **Nov. 21** (this is the Wednesday before Thanksgiving). This is submitted to the first reader only who will read it, make comments and suggestions, and return it to you by Dec. 3. During the next week, your job is to then revise the thesis and do any necessary rewriting. The final draft (2 laser-printed copies) should then be turned in on **Dec. 10** to both your first and second readers. The Dec. 10 due date for your final draft is a non-negotiable one and, except for documented medical excuses or catastrophic personal trauma, no extensions will be given. Papers turned in after this due date will be penalized by one grade step for each day of lateness.

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 4.0 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.

Semester Two

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 collection of data, it is often 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 actually 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 are in the midst of data analysis and the writeup of the Results and Discussion sections.

Feb -- Mar: During the 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.

Apr. 19: First Draft of Thesis Due (faculty will return it with comments by Apr. 26)

May 3: Final Draft of Thesis Due

The final paper must include all sections (Abstract, Introduction, Methods, Results, Tables and Figures, References, and Appendices). Turn it in on April 19 to your first reader alone. He or she will provide comments and feedback, and return it to you by April 26. The following week will be spent making revisions on the final draft, which is due on May 3 and should be handed in to both first and second readers. This is a non-negotiable deadline and papers turned in after this date will be subject to a grade reduction. Project groups can, of course, negotiate earlier dates for turning in first and final drafts.

The following is a brief description of those sections of the paper that did not appear in your first semester thesis:

I. Abstract

A 100 word (or so) summary of your paper. 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 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.

II. Results

You have some choice in the way you organize your presentation of results. Remember that the purpose of the results section is to provide the data that will enable you to answer the questions/hypotheses that motivated the study. You want to organize the section so that the relevance of the data to the questions discussed in the background section is made as clear as possible. A major problem in many student papers is that the organization of results is based on the use of certain statistical tests rather than the relevance of findings to the initial set of hypotheses.

The usual data presentation is divided into sub-sections, one per hypothesis or study question. All the results and tests relevant to a given 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. (We use boldface type here because students often think they have completed their results section once they have presented the outcomes of their statistical tests.) 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, the statistical part of the results within a sub-section begins by stating the general 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 different statistical tests is:

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 describe the results can either be incorporated into the text or placed after the Reference section. Data pertaining to a given finding should be reported in a table or graph, but not both. Tables and figures should correspond to APA style (see the manual). Please do not simply cut and paste tables from your statistical output (e.g. SPSS printouts), because such tables typically do not conform with APA style. Your advisor can help if you have any questions about the proper way to report your data analysis procedures and findings.

III. Discussion

The Discussion presents the implications of the results for the study questions/hypotheses. It is where you answer the questions or evaluate the hypotheses that inspired the study. In contrast to the Introduction, it is organized from specifics to generals. That is, begin by discussing what you found relative to the set of original hypotheses. Then discuss these on a more general theoretical level and how your findings extend the previous literature.

Even when your results support your hypotheses, you should try to think about alternative explanations and discuss why these do not fit the data as well as the ones you presented. Sometimes some additional data or background research may be described here if they are relevant to judging the appropriateness of the alternative explanations. The discussion normally concludes by presenting ideas for future research.

IV. 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.

May 7 & 8: Final Oral Presentations

May 9: Posters due

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 be meeting 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 min.). 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, but 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.

Posters

Finally, 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. The poster must be prepared and tacked up by the end of the day on May 9th. More information about the preparation of posters will be distributed in the spring semester.

By this time, 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 (e.g., achieving a final draft of your Introduction and Method sections during the first half of the second semester). We also want to reassure you that, 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 we are here to work closely with you and if you have any problems at all, come and talk to us so we can work on resolving them.