COGNITIVE SCIENCE SENIOR HONORS THESIS GUIDELINES

Students interested in pursuing graduate study should seriously consider the Cognitive Science departmental honors program. Students participating in the departmental honors program gain research skills, in depth knowledge of a particular cognitive science area, and close contact with individual faculty members. Completion of an independent project and an honors thesis prepares students for study beyond the undergraduate level, allowing them to transform their research interests into focused investigation, original project development, and coherent presentation of research results. Successful participation in the departmental honors program also communicates student commitment and motivation to graduate admission representatives. A student must have a **minimum cumulative grade point average of 3.3** to be eligible for consideration and must maintain this minimum average during their course of study to graduate with departmental honors. If a student wishes to combine honors projects in Cognitive Science and another department or program, every attempt will be made to accommodate such a plan, but the student must discuss this with the Director of Undergraduate Studies to gain approval.

TIMELINE FOR COMPLETION

Sophomore Year œ Begin taking Cognitive Science courses, including at least 2 core courses. Identify your concentration area and take at least 1 course in this area. In addition, take a breadth course to expand your interests and to explore the possible topics available to you. Begin to take any courses that you feel may be critical to your research. This may include Computer courses. Identify and apply to a lab in which you would like to work or volunteer in for your Junior year. Let the Academic Advisor know that you are interested in the Honors Thesis.

Summer before Junior Year œ Begin to actively think about possible topics for your thesis. Consult the section —Where to Find a Topic“ to aid you in this process.

Junior Year œ Find a faculty mentor. Consider professors you think you can work with on a more involved level, and consult faculty profiles to find matching interests. Schedule an appointment with your first choice and discuss potential research topics and their willingness to sponsor you. If your topic of interest is not currently being examined here at IU, discuss this with a receptive member of the faculty. However, keep in mind that due to logistical or expertise reasons, you may not be able to pursue some lines of inquiry.
Put together the proposal for the thesis, including a timeline. Many theses take at least a 12 month commitment, so the earlier the proposal is done, the better the project can be. The proposal can be informal, but an application for Honors must be filed and approved by the Director of Undergraduate Studies. This form may be found on the department‘s webpage, or from the Academic Advisor. This is also the time to address any ethical considerations, such as Human Subjects.

Summer Before Senior Year œ Begin your literature review if you have not done so already. Remember that Inter-Library Loan may take a few weeks to fill an order.

Senior Year œ Enroll in COGS Q499 Honors Research Project in the Cognitive and Information Sciences for at least 3 credits (many students enroll for 6 credits) each semester. Your research ideas and design will be refined as you begin to work on the project, and data collection should begin. You should be regularly meeting with your mentor to discuss your progress. Identify two additional faculty members besides your mentor to form the three people Undergraduate Honors Thesis Committee. Two of these three individuals must be on the Cognitive Science faculty. They should have knowledge and skills that compliment each other and your topic.
Data collection should be complete, or nearly so, by the start of your second semester. Discuss with your mentor, and possibly those on your committee, the direction your thesis will take. Consult them regarding your analysis and any problems you encounter. Refer to the section —Manuscript Preparation“ for the appropriate form your written project will need to take, and begin writing.

When your thesis reaches its final draft, you will defend it orally before your Thesis Committee, typically by the middle of the second semester, and definitely by one month prior to graduation. Once it is successfully defended and all adjustments are made, two copies of the thesis are required to be bound and submitted to the Cognitive Science Program. It is also courteous to give members of your Committee bound copies. If this is all completed prior to one week before graduation, you will be certified to receive Honors in Cognitive Science. Congratulations!

WHERE TO FIND A TOPIC

Coming up with your own original research project can seem like a daunting task for many undergraduates. However, it does not need to be as difficult or ground breaking as you think. A good original research project often is based on previous work. There are a few ways to come up with a thesis topic, some better than others.

(1) Await divine inspiration.

(2) If something from one of your classes or readings peaks your interest, do some light background research into the area. What are other people doing to examine the problem? Do they provide suggestions for future research? Do you disagree with an author and wonder what would happen if they had tried X?

Questions to keep in mind as you evaluate topics include: Is the topic narrow enough to complete in one year? Is there sufficient background information to form a basis for your project? Has this already been done? How expensive will this project be?

Speak with a faculty member who works on research similar to your interests, and discuss. This will generally narrow your topic into a manageable thesis, and the faculty member can determine quickly whether it will be feasible or not.

(3) Specifically ask a faculty member if they have any ideas. They may have several ideas that need to be addressed, and would appreciate a student tackling one.

Discussions with faculty are critical in focusing your topic and developing new ideas. Creative thoughts often are produced in these exciting dialogs. Keep in mind that thesis research is highly involved and takes a large commitment on your part. If you are not truly interested in the topic, you may have difficulty staying on track and finishing. Remember that no matter what path you take to get a thesis topic, you will be responsible for developing the project, conducting the research, and obviously coherently writing the thesis.

WHAT EACH SECTION SHOULD INCLUDE

Abstract œ This is a summary of your entire thesis, and should be ² to one page double spaced in length.

Introduction œ Basically, this is your critical review of relevant literature. Theoretical as well as methodological issues may be analyzed. You begin by clearly outlining what your research addresses, concisely summarize relevant research, and end with an explicit statement of the purpose of your study, your hypothesis, and perhaps a brief mention of the method that will be used to test the hypothesis. You should also include any assumptions or biases you identify in your research. Depending on your topic, your review of literature will probably be 6-20 pages in length and include 10-20 references. The majority of references should be from peer reviewed journals and relatively recent (up to 10 years old). When referring to articles, remember to summarize the research in your own words and keep quotations to a minimum.

Methods œ Materials and methodology that were used are clearly explained and in sufficient detail so that another may replicate your methods. This includes any ethical procedures that you followed. All your variables are explained and defined, and the demographics of subjects, etc. are also identified, including your recruitment procedures. If you administered a questionnaire similar measure device, include it as an appendix and refer to it in the text.

Results œ You should present a summary of your statistical analysis and any tables and figures that help present those results. If you wish to include the actual —raw“ data, you may do so as an appendix, but only after discussing this with your faculty sponsor. If something is better displayed visually (such as in a table), refer to the table in the text in a manner that allows a reader to understand what they should look for, but you do not need to go over every single digit in the text. This section should not be any longer than is necessary and are often only a few pages in length (text-wise).

Discussion œ Here you will discuss the implications of your results and link them to past and/or future research. Whether your hypothesis was confirmed or reputed must be stated. If a piece of literature was relevant enough to include in the Introduction, it should probably appear again here. New references can also be introduced if they are relevant in explaining your results, but were not a part of your hypothesis development. Any potential ethical issues should also be addressed, as well as a discussion of your biases and limitations or problems encountered in conducting the study.

Conclusion œ This section will be shorter than most of the others, and will summarize all previous sections. The conclusions drawn from your research should be explicitly and concisely

stated. In a way, this will simply be a longer version of your abstract. You should also include any ideas you have for future direction of research.

References œ All references that were cited must be listed and presented in APA format.

Appendices œ Not all theses need to include an appendix. It is reserved for details that would have distracted the reader in the main portion of the text, but may be necessary to the understanding of your methods or results. Items to include are any questionnaires given to participants or raw data that is critical.

MANUSCRIPT FORMAT

The Honors Senior Thesis should follow the general conventions specified in the Publication Manual of the American Psychological Association (1200 Seventh St., N.W., Washington, D.C. 20036), with the exceptions and considerations listed below. Another format will be allowed if the student and Committee deem it more applicable. For general aesthetic appearance, you may consult the department‘s Ph.D. dissertations and Honors theses stored in Sycamore Building 0014.

Order of Items in the Thesis œ Front Matter (each is given its own page): Title Page, Acceptance Page, Acknowledgements, Abstract, Table of Contents, Lists of Tables, Figures, Appendixes and Abbreviations. Content (each section should begin on a new page): Introduction, Methods, Results, Discussion, Conclusion, and References Cited. You may also include your Curriculum Vita at the end of the thesis.

Preparation of Manuscript - Please double space all material from the Introduction to Conclusion and use 8 ² inch by 11 inch white paper. Manuscripts should have 1.25 inch left hand margins to account for binding, and 1 inch margins on the remaining sides. In departure from APA format, tables, figures, and figure captions that are integrated into the text body rather than separated into sections is fine. All tables and other end-of-paper matter except art should be numbered. The Front Matter should be numbered using small Roman numerals. The title page counts as page i, but does not bear a number. Begin numbering with the acceptance page as page ii, and continue with small Roman numerals until the start of the actual text. That page, whether part of your full introduction or of your first chapter, will be numbered page 1 and every page will be numbered consecutively until you reach the vita page (not numbered). This means the first numbered page to appear will be the Acceptance page, and listed as —ii“. The first page of the Introduction should be numbered —1“. Page numbers should appear centered or on the right side of each page.

Numbering of Figures and Tables -Each figure and table must be mentioned in the text and must be numbered consecutively using Arabic numerals in the order of its appearance in the text. A brief title should be typed directly above each table. Tables do not need any legends, and any explanations or clarifications of tabular material should be indicated as a footnote to the table by means of lower case letters.

References - Students should refer to the APA Publication Manual for the correct listing of references in the text and reference list. All references must be closely checked in text and lists to determine that dates and spellings are consistent. Please note that the names of all authors should be given in the list of references, and "et al." used only in the text. Examples for books, journals, and conference proceedings follow:

Reisen, A.H. (1966). Sensory deprivation. In E. Stellar & J.M. Sprague (Eds.), *Progress in physiological psychology* (Vol. 1). New York: Academic Press.

Atkinson, R.C., & Shiffrin, R.M. (1971). The control of short-term memory. *Scientific American*, 225, 82-90.

Keane, M.T.(1995). On order effects in analogical mapping: Predicting human error using IAM. In J.D. Moore & J.F. Lehman (Eds.), *Proceedings of the Seventeenth Annual Conference of the Cognitive Science Society* (pp. 449-454). Mahwah, NJ:Erlbaum.

Spelling, Terminology, and Abbreviations - The Third Edition of Webster's Unabridged Dictionary is the standard reference work when in doubt. Please try to avoid jargon and, wherever possible, abbreviations that are not commonly accepted.

Binding œ The thesis must be bound and turned into the Academic Advisor at least one week prior to graduation. Acceptable formats include a spiral, spin and tape binding. Copies and More, located in the Indiana Memorial Union Bookstore, and other businesses in Bloomington will bind your thesis for a small fee. Before you have the thesis bound, you may wish to show a copy to the Academic Advisor to double-check that the proper format was followed.

SAMPLE TITLE PAGE: TITLE CENTERED, ALL IN CAPITAL LETTERS

Your Name

Submitted to the faculty of the Cognitive Science in partial fulfillment of the requirements for departmental Honors in the degree of Bachelor of Science in the Cognitive Science Program, Indiana University Month Year

Accepted by the Cognitive Science Faculty, Indiana University, in partial fulfillment of the requirements for conferral of departmental Honors in the Cognitive Science Program.

Faculty Sponsor, Ph.D.

Thesis Committee

Committee Member, Ph.D.

Month Day, Year

Committee Member, Ph.D.

ORAL DEFENSE

This should be looked upon as a time to discuss your research with your Committee members as colleagues. Most students who undertake an Honors Thesis will be highly motivated and intelligent, and most plan on pursuing Cognitive Science after graduation. Therefore, you need to begin your training as a professional, and this is a time to show not only what you know, but that you have presentation skills that are necessary to convey that information. You should be prepared to take constructive criticism as well as praise. The format for each oral defense will depend on the Committee members involved, and should therefore be discussed when the committee is formed.

SUGGESTIONS

- GET ORGANIZED! This includes developing a filing system for articles and notes, a binder dedicated to your project development, and other such things you deem necessary.
- Never throw anything away! Save notes, references, and copies of articles even if you feel that they are not directly relevant to your topic. Some ideas will be discarded as you conduct your research, and others will develop. You often find that something that seemed irrelevant early on becomes crucial. Keep these articles and notes in a separate binder or folder.
- Start writing as soon as possible and try to maintain a schedule of writing a little everyday, even if it just notes on an article you read or your research. Harry Bauld said, —The hardest thing to do is budge an object from a dead start, particularly if that object is your brain“.
- Become familiar with the various libraries and associated librarians on campus that will pertain to your research. Knowing a friendly face that can help you, especially if you are in a time of stress, will mean a great deal to you.
- Form a support group with other Cognitive Science Honors students. It is comforting to know that you are not alone in your undertaking, and they may have creative solutions to many of your problems.
- Feel free to stop by and talk with the Academic Advisor!
- Remember that very few things in life are free. Plan a budget for photocopies and other equipment that you will need. Discuss this with your mentor. Occasionally a lab may have funds to cover these expenses.

Cognitive Science Departmental Honors Program
Application for Admission

Student Name_____ **Student ID**_____

Expected Graduation Date_____ **Cumulative G.P.A.**_____

Honors Project/Thesis Abstract
(Briefly describe the nature of your independent project and thesis content)

Student Signature _____ Date _____

Cognitive Science Honors Thesis Committee

Chairperson_____ Home Dept._____ Signature_____
Committee Member_____ Home Dept._____
Signature_____

Committee Member_____ Home Dept._____
Signature_____

Return this form to:

Dr. Joshua Brown, Cognitive Science Undergraduate Program

Psychology Building , Room 336

Bloomington, IN 47405 Date Submitted_____ Director, Undergraduate

Studies_____ Date_____

SOURCES CONSULTED OR MENTIONED

Bauld, H.J. (1987) *On Writing the College Application Essay: Secrets of a Former Ivy League Admissions Officer*. New York: Barnes & Noble.

Indiana University Office of Research and Graduate School. A Guide to the Preparation of Theses and Dissertations
http://www.indiana.edu/~grdschl/guide.html

Matthews, G., Davis, M.S., Phillips, W., & Bartolini, L.A. (2002) Senior Thesis Handbook: A Guide to the Senior Thesis Process. Dominican University of California: Psychology Department.

http://www.dominican.edu/_filestore/PSY_Senior_Thesis_Handbook.pdf

Peters, R.L. (1997) *Getting What You Came For: The Smart Student's Guide to Earning a Master's or a Ph.D.* New York: The Noonday Press.

Senior Research in a Bachelor of Science in Environmental Science at Indiana University
http://www.iub.edu/~bses/senresfr.htm

Submission Information for Authors of *Cognitive Science*
http://www.cognitivesciencesociety.org/submission.html