

**Cognitive Psychology Graduate Training Program
MA/PhD Program Requirements
University of Colorado, Boulder**

August 12, 2006

The Training Area in Cognitive Psychology is a program of graduate study leading to the degree of Doctor of Philosophy in Psychology. The requirements described below reflect those set by the Graduate School and the faculty of the Cognitive Psychology Graduate Training Program. To state the requirements for the Doctor of Philosophy degree in terms of credit hours would be misleading. Students who receive this degree must demonstrate that they are proficient in some broad subject of learning and that they can critically evaluate work in this field; furthermore, they must have shown the ability to work independently in their chosen field and must have made an original, significant contribution to the advancement of knowledge. Studies leading to the Doctor of Philosophy degree must be chosen to contribute to specialized competence and a high order of scholarship in a broad field of knowledge. A field of study chosen by the student may reside within one department or it may include two or more closely related departments. The criterion of what constitutes an acceptable field of study shall be that the student's work must contribute to an organized program of study and research without regard to the organization of academic departments within the University.

The requirements and procedures described herein reflect an emphasis on timely progress toward completion of the degree and on providing students with early and reliable feedback on their progress. To achieve this, we have specified several stages where students will be evaluated by the faculty to assess strengths and weaknesses, and to specify possible unfavorable outcomes such as probation or dismissal from the program. Although it is important to specify these possible outcomes, we expect them to be extremely rare. All students are admitted to the graduate program with the expectation that they will successfully complete the Ph.D. requirements, so these measures should not be interpreted as reflecting any intention to “weed out” students from the program.

Overview	<u>page</u>
A. Coursework 2	
• Core Coursework	2
- Graduate Statistics	2
- Proseminars	2
• Continuing Coursework	2
• Minor Requirement	3
B. Research	3
• Annual Research Presentations	3
• First Year Project	3
• Masters Degree	3
• Preliminary Exam	4
• PhD Degree	6
C. Teaching Experience	7
D. Summary of Deadlines	8
E. Progress Reviews	9
F. Miscellaneous	9
G. Typical Path to the Doctoral Degree in Cognitive Psychology	10

* For more information on Graduate School rules, thesis requirements, etc go to:

<http://psych.colorado.edu/~cognitive/co-requirements.html>

A. Coursework

Core Courses

1. Graduate Statistics

In the first year, all students must take Graduate Statistics (PSYC 5741 and 5751).

2. Proseminars

In addition, all students are required to take the three-semester Cognitive Proseminar sequence (PSYC 5685, 5665, and 5815). This Proseminar sequence is team-taught by members of the faculty in the program and is designed to provide a comprehensive overview of basic research methods and major content domains within cognitive psychology and cognitive neuroscience. The Proseminar sequence consists of the following six half-semester modules:

1. Research methods (PSYC 5685, Section 1);
2. Sensation and lower-level perception (PSYC 5685, Section 2);
3. Higher-level perception & attention (PSYC 5665, Section 1)
 - including object/face recognition, imagery, and attention
4. Learning and memory (PSYC 5665, Section 2);
5. Language (PSYC 5815, Section 1);
6. Higher-level cognition (PSYC 5815, Section 2)
 - including problem solving, reasoning, judgment and decision making

Although there is no module specifically dedicated to cognitive neuroscience, relevant work that uses cognitive neuroscience methods will be incorporated within each module.

Each module of this Proseminar sequence lasts one half-semester. Thus, Modules 1 and 2 will be covered in the fall semester of the first year (these are sometimes run concurrently, rather than consecutively), Modules 3 and 4 in the spring semester of the first year, and Modules 5 and 6 in the fall semester of the second year. Students must pass the essay exam given at the end of each module to demonstrate their mastery of the materials covered in that module. These exams will fulfill one component of the Preliminary Examination (as specified below).

Continuing Course Requirement

Each student is required to take at least one graduate course in Cognitive Psychology each year, beginning in the third year, until the student graduates. Students pursuing a joint PhD in Cognitive Science or Neuroscience, or a certificate in Behavioral Genetics will be allowed to waive this requirement until the course requirements for those other programs are met. To ensure the broadest possible exposure, this course requirement should ideally be met by taking a course from a professor with whom the student has had no previous course. Students are strongly encouraged to take Cognitive Psychology seminars, but they may also petition for courses of particular relevance offered outside the program to count for this requirement. If no such seminars are offered, then courses outside the area can be used to fulfill this requirement.

Minor Requirement

To fulfill the minor requirement for the Doctor of Philosophy degree, the student must take at least two courses, 5000-level or above, outside his or her major area of specialization. The two minor requirement courses should be approved by the program director. For students with previous graduate work at another university, the minor requirement cannot be waived. For those students, appropriate transfer credit toward the minor may be given at the discretion of the Program Director.

B. Research

Research is the primary focus of graduate training, and students should be continuously engaged in research throughout their graduate careers. The following sections describe the formal minimal research requirements.

B1. Annual Research Presentations

Each student is required to present his or her research to the members of the program (both faculty and students) at least once each year, until the student graduates. In the first and second years, the presentation forum is usually the Department's Ekstrand Memorial Mini-Convention held late in the spring semester (typically the last Monday of Spring Semester). In the third year and the subsequent years, the forum for this is typically the Cognitive Lunch meeting (every Monday at Noon).

B2. First Year Project

Each student must select a provisional faculty advisor by the end of the first month, design a research project during the first semester, and complete the project by the end of the second semester. The results of this first-year project must be reported at the Department's Ekstrand Memorial Mini-Convention held late in the spring semester (typically the last Monday of Spring Semester). The student must also turn in a complete written report of the first-year project on or before the date of the Mini-Convention. An advisory committee that consists of three members of the Cognitive Program, formed by the student and his or her faculty advisor, will evaluate the progress of the first-year research on the basis of the quality of both the oral presentation and the written report.

B3. Master of Arts Degree

In order to be admitted to candidacy for the Doctor of Philosophy degree, each student in the program is required to earn a Master of Arts degree. Deadline for completion is by September of the student's third academic year.

The minimum requirements for the degree are:

1. Twenty-four hours of course work with a grade of B- or better in each course and 6 hours of master's thesis hours for a total of 30 hours of credit.
2. A thesis approved by a Psychology Department faculty committee of three (see below).
3. Completion of the statistics requirement with B- or better in each semester.
4. All requirements imposed by the Graduate School.

Master's Thesis

A Master's Thesis Advisory Committee of three persons is formed by the faculty advisor in consultation with the student and the program director. The student must submit a written proposal for a Master's thesis project to the advisory committee for approval. The proposal should be approved, including Committee meeting, by May of the second year.

The Master's thesis must:

1. Deal with a definite topic related to the student's major field of interest;
2. Be based upon independent study and investigation;
3. Represent the equivalent of at least six semester hours of work;
4. Comply with the other requirements of the Graduate School;
5. Be completed, including oral defense, before October of the third academic year.

Each candidate for the Master's degree takes an examination after the thesis has been completed. This examination is conducted orally by the three members of the thesis advisory committee and is open to the public. Students are expected to send an email announcement of the defense time, along with the title and abstract, to all cognitive faculty and students. Although this examination focuses on the Master's thesis, other work in formal courses and seminars in the major field may also be covered. The thesis advisory committee votes on whether the candidate has passed the examination and makes a recommendation to the program faculty about whether or not the student should be permitted to continue work toward the Doctoral degree. Students who have not completed their Master's degree before October of their third year will be terminated from the program.

The thesis can be evaluated at 3 levels as determined by the committee:

1. *Passed at the Doctor of Philosophy Level:* The student has passed the thesis at a high level and can continue toward pursuit of the Ph.D. This is the expected outcome for most students.
2. *Failure at the Doctor of Philosophy Level, Masters Level Pass Only:* The student passes with a Master's degree, but is not allowed to continue toward pursuit of the Ph.D. beyond the third year (i.e., the student may complete the present academic year).
3. *Failure at Masters Level:* The student is not awarded a Master's degree, and is not allowed to continue toward pursuit of the Ph.D. beyond the third year.

B4. Preliminary Examination

Before admission to candidacy for the Doctor of Philosophy degree, the student must pass a preliminary examination in the field of concentration and related fields. This examination will test the student's mastery of a broad field of knowledge, not merely the formal course work completed.

Preliminary Examination Structure

1. Proseminar Exams

Students will take 6 half-semester proseminars during their first 3 semesters in the program. These proseminars will fulfill the breadth requirement of the preliminary exams. Each proseminar will include a written final exam. Typically, take-home exams will be given, with about 3 questions that each require approximately 3-5 page answers (double spaced). The grade on the

exam will be recorded separately from the course grade (the latter would likely include other components such as presentation grades). Any student receiving a grade below B- on any proseminar exam will have failed the preliminary exam. If an individual instructor intends to assign a failing grade on an exam (below B-), the instructor will distribute the exam to the rest of the faculty to solicit further opinions. If needed, a faculty meeting will convene. The faculty may consider options other than failure of the preliminary exam (e. g., probation) if extenuating circumstances do not indicate that failure (and subsequent dismissal from the program) is warranted.

2. Literature Review Paper

Students will prepare a literature review on a topic that is likely to be their dissertation topic, or any area that the student is considering for a dissertation topic. A three-person committee will evaluate the paper.

- Proposal. The committee will be assembled after the “Post-Master’s Review” (see above), and a written proposal will be approved by the committee by April of the third year. The proposal should be approximately 1000-2000 words in length. Because the successful final paper needs to go beyond a mere summary of the relevant research, the proposal should identify specific themes and questions that will be critically evaluated in the paper. Two lists of references should be provided. (1) At least 10-20 “Completed Readings” should be listed to demonstrate that the student has begun reading the relevant literature. (2) “Intended Readings” should include 20-40 additional references that the student intends to include in the final paper. These numbers are merely rough guidelines that will vary with the student’s current mastery of the literature, and it is expected that the final paper will contain many references not listed within the proposal.

- Final Paper. The student is expected to produce a high-quality integrative review that could be published in such journals as *Psychological Bulletin* or *Psychonomic Bulletin & Review* (or some other appropriate, more specialized journals that publish review articles). The paper should be about 10,000 to 15,000 words and include about 50 to 80 references, but these are only rough guidelines that might be modified by recommendations of the committee in order to insure that the paper is sufficiently broad to cover the chosen topic. It is expected that the student’s advisor will read drafts of the paper, and will provide guidance on these issues. By December of the 4th year, there will be an oral defense that gives the committee an opportunity to ask students questions about the paper and topic. Several sample papers are listed below. They may not conform to the length guidelines, but each generally exemplifies the kind of review that should be strived for:

- Healy, A. F., & McNamara, D. S. (1996). Verbal learning and memory: Does the modal model still work? *Annual Review of Psychology*, *47*, 143-172.
- MacLeod, C. M. (1991). Half a century of research on the Stroop effect: An integrative review. *Psychological Bulletin*, *109*, 163-203.
- Mix, K. S., Huttenlocher, J., & Levine, S. C. (2002). Multiple Cues for Quantification in Infancy: Is Number One of Them? *Psychological Bulletin*, *128*, 278-294.
- Schacter, D. L., Norman, K. A., & Koutstaal, W. (1998). The cognitive neuroscience of constructive memory. *Annual Review of Psychology*, *49*, 289-318.
- Wixted, J. T. (2004). The psychology and neuroscience of forgetting. *Annual Review of Psychology*, *55*, 235-269.

Preliminary Examination Evaluation

In both the Proseminar Exams and Literature Review Paper, students will need to demonstrate the following abilities:

- (1) Mastery of the relevant literature.
- (2) An ability to critically analyze and synthesize previous research, rather than simply reviewing/listing.
- (3) An ability to clearly connect data and theory.

The graduate school requires an examining board of five (5) Graduate Faculty for the Comprehensive Examination. The complete examining board will include the three (3) faculty members on the Literature Review Paper committee and two (2) of the student's proseminar instructors. These five will sign the evaluation document after all requirements are complete.

The examination can be evaluated at 3 levels as determined by the committee:

- (1) *Passed at the Doctor of Philosophy Level:* The student has passed the examination at a high level by meeting all expectations (B- or above) on both the Proseminar exams and Literature Review. This is the expected outcome for most students.
- (2) *Failure at the Doctor of Philosophy Level, Option to Revise the paper:* The student does not pass at a high level, but is given an opportunity to revise the paper. If the paper is sufficient in many respects, but has a few notable deficiencies that are relatively straightforward to address, then the option to revise will be considered. If, however, the paper is deficient in many ways and/or severely so, then revision will not be an option. The Proseminar exams cannot be re-taken, so must be passed on their initial administration.
- (3) *Failure at the Doctor of Philosophy Level:* The student does not pass, and will not be advanced to candidacy for the doctoral degree.

B5. Doctor of Philosophy Degree (PhD)

Admission to Candidacy

A student must apply for admission to candidacy for the Doctor of Philosophy degree on forms supplied by the Graduate School office at least two weeks before the preliminary examination is defended. The student must have completed at least three semesters of residence and must have passed the preliminary examination before admission to candidacy. The chair of the student's doctoral advisory committee must sign the Application for Admission to Candidacy Form.

Doctoral Advisory Committee

The Doctoral Advisory Committee is made up of at least five (5) members of the graduate school faculty. Of those, at least three (3) members must be from within the Cognitive Psychology program and at least one (1) from outside the department (i.e., a fifth member could be from within the program, from one of the other programs in the Department, or from outside the Department). Depending on the student's fields of interest, additional members of the committee may be appropriate. The Doctoral Advisory Committee is formed by the major advisor in consultation with the student. The committee membership must be approved by the Director of Graduate Studies. One purpose of the advisory committee (beyond guiding the student in his or her graduate study) is to prevent overly narrow specialization.

Doctoral Thesis Proposal

Students will submit a formal dissertation proposal by December of their fourth year. The proposal will follow the format of the “Research Training Plan” section of an NRSA pre-doctoral fellowship application (excluding “Human Subjects Research” section). NIH's official page limit for this section is 10 pages. The faculty recommend: (1) Specific aims = 1 page, (2) Background and Significance = 2-3 pages, and (3) Research Design and Methods = 6-7 pages. The NIH page limitations will not be strictly enforced, and the methods of the experiments should be presented in detail. Furthermore, these page limitations include single-spacing and 11-point “Georgia” font. For details see page 22-23 of the instructions (Rev. 10/2005) at: <http://grants2.nih.gov/grants/funding/416/phs416.htm> .

Doctoral Thesis

The doctoral thesis is based upon an original investigation and shows mature scholarship and critical judgment as well as familiarity with tools and methods of research. To be acceptable, this dissertation should be a worthwhile contribution to knowledge in the student's special field. The doctoral thesis must be finished and submitted, in typewritten form, to the committee members for inspection at least two weeks before the day of the final examination.

Final Examination

After the thesis is made available to the advisory committee, a final examination on the thesis and related topics is conducted. This examination is oral and is open to anyone. The examination is conducted by a committee appointed by the Dean of the Graduate School, consisting of at least five persons, one of whom must be from outside the department. Normally the members of the advisory committee serve as the examination committee. More than one dissenting vote will disqualify the candidate in the final examination. The format of the exam is determined by the committee, but typically it begins with a presentation by the candidate of the dissertation topic. The candidate is expected to answer questions about the thesis topic itself as well as about other related subjects. Arrangements for the final examination must be made in the dean's office at least two weeks in advance. The time and place of examination must be publicly announced in the department and a copy of the finished thesis must be available for inspection in the main office at least two weeks before the examination. Upon passing the final examination, the completed thesis will be turned in to the Graduate School within a one-month period.

C. Teaching Experience

All students must obtain teaching experience prior to the awarding of the Doctorate. This requirement is normally met by serving as a Teaching Assistant for at least one semester. Serving as a CLIPR TA does not fulfill the teaching experience requirement.

D. Summary of Deadlines

All students are required to complete their degree requirements by the end of their fifth year in the program unless they (a) are completing a joint Ph.D. in Cognitive Science or Neuroscience, or a Certificate in Behavioral Genetics (see Deadlines below); or (b) have requested and received a leave of absence during that time. Students failing to meet this deadline are terminated from the program unless they receive an approved extension. A request, in writing, for an extension must specify the extenuating circumstances necessitating the extension. Furthermore, approval of the request requires that, in the opinion of the program faculty, the student is making demonstrable progress toward completion of degree requirements and that the final completion date can be predicted with reasonable certainty. The program faculty will not grant most requests for extension; students should plan their programs with this consideration in mind.

The following deadlines will be strictly enforced, and failure to meet these deadlines may result in probation or dismissal from the program. The primary exception to these deadlines will involve students pursuing joint Ph.D.'s in Cognitive Science or Neuroscience, or a Certificate in Behavioral Genetics. These students will be allowed additional time to complete their Preliminary Exam Paper (Literature Review) and their Ph.D. Proposal, as specified below. Students pursuing only a certificate in Cognitive Science will not be eligible for these extensions. Although the deadlines in the first two years will typically be close to the actual completion dates, students are encouraged to complete all requirements as soon as possible rather than waiting for deadlines at each step. For example, a student who completes the Comprehensive Examination requirements early will have more time to complete the Ph.D. dissertation. Extended deadlines for joint-degree students should be considered as deadlines of last resort. In most cases we expect completion much before those dates. In all cases, committees have the discretion to set their own deadlines for individual students.

Standard Deadlines

First Year Project – End of Second Semester of First Year (typically last Monday of Spring Semester)

Master's Proposal – May of 2nd Year

Master's Defense - September of 3rd Year

Preliminary Exam Paper Proposal - April of 3rd Year

Preliminary Exam Paper Defense - December of 4th Year

PhD Proposal - April of 4th Year

Extended Deadlines for Joint Degrees

Preliminary Exam Paper Defense - December of 5th Year

PhD Proposal - April of 5th Year

Students Admitted Prior to Fall of 2004

The present requirements apply to all students admitted on or after Fall of 2004. Students completing proseminars on or before Fall of 2004 may not have taken written final exams. In these cases, the exam requirement will be waived for those proseminars (for completion of the Preliminary Exam).

Students admitted earlier will have the present requirements amended as follows:

Students Admitted Fall 2003 – The Master's thesis deadline is extended to December of the third year, although earlier completion is strongly encouraged. All subsequent requirements herein

will be met.

Students Admitted Fall 2002 – All of the present requirements to be completed after the Master's Thesis must be met.

Students Admitted Prior to Fall 2002 – These students will be held to the previous requirements that were effective upon their admission (available from Cognitive Program Director). Whenever possible, these students are encouraged to follow the present guidelines (e.g., dissertation proposal format).

E. Progress Reviews

The program faculty meets regularly to review each student's progress. The Program Director provides each student with a written summary of that evaluation. Grades in required and optional courses and seminars as well as performance in research and teaching assistantships enter into this evaluation. Students whose progress is judged not satisfactory in some respects will either be (a) put on probation or (b) terminated from the program. Students not showing sufficient promise may be encouraged to leave the program and/or placed on probation, even if they have met the nominal program requirements. It is impossible to stipulate all the conditions under which this situation may arise, but a general scenario is that the student passed all requirements, but the performance on several components was marginal. Students who are put on probation must fully address all the concerns stated in their written summary by the specified date to continue their graduate study. The timing of these progress reviews is as follows:

1. First Year Review – All first-year students will be evaluated at the end of their first semester, so potential concerns can be identified as soon as possible.

2. Post-Master's Review – All students will be evaluated soon after completion of the Master's defense (early October of the third year). The purpose of this meeting will be to provide students with feedback at this critical stage of their careers when they should have earned the Master's degree and are about to begin the Ph.D. requirements. The faculty will consider each student's accomplishments to that point (first-year project, Master's thesis, pro-seminars).

3. Yearly Review – All students will be evaluated at the end of each year. Prior to this review, each student must complete an Education Plan that will be submitted to the Cognitive Program Director. The Cognitive Administrative Assistant will distribute an Education Plan form to students near the end of the spring semester, and it should be completed and submitted by the end of the semester.

F. Miscellaneous

All Graduate School requirements pertaining to residence, minimal credit hours, Master's thesis and Doctoral dissertation must be met before completion of the program. Students who enter the program with a Master's degree from another university may be excused, upon petition to the program faculty, from writing another Master's thesis. Such students are subject to the same evaluation at the end of the first year as the other first-year students. After the first year research project is completed, the Preliminary Examination Committee can be formed and the examination scheduled as soon as is appropriate.

G. Typical Path to the Doctoral Degree in Cognitive Psychology

The requirements indicated by * must be completed by the specified deadline for students to be allowed to continue their graduate study.

I. First Year

- A. the General Statistics sequence (two semesters)
- B. the first two-thirds of the Cognitive Proseminar sequence (two semesters)
- C. conduct and complete the first-year research project
- D. department research presentation (Mini-convention talk)*
- E. turn in a complete written report of the first-year project by the end of the second semester*
- F. Apply for in-state resident status with University Registrar in June/July before second year begins.

II. Second Year

- A. the remaining portion of the Cognitive Proseminar sequence (one semester)
- B. work on a minor area requirement
- C. work on Master's Thesis
- D. department research presentation (Mini-convention talk)*

III. Third year

- A. Complete Master's Thesis including Oral Defense (before October)*
 - Know the graduate school requirements, thesis specifications, and have the appropriate forms:
<http://www.colorado.edu/GraduateSchool/currentmenu.html>
- B. form Preliminary Examinations committee and have the Literature Review proposal approved by the committee by April*
- C. complete minor area requirements
- D. complete teaching experience requirement
- E. one graduate course not included in the core requirements
- F. cognitive lunch talk

IV. Fourth year

- A. Complete and Defend Preliminary Exam paper by December*
- B. form Doctoral Dissertation advisory committee
- C. prepare the written doctoral dissertation proposal by April*
- D. one graduate course not included in the core requirements
- E. cognitive lunch talk

V. Fifth (and Sixth) years

- A. carry out dissertation research and write dissertation
 - Know the graduate school requirements, thesis specifications, and have the appropriate forms:
<http://www.colorado.edu/GraduateSchool/currentmenu.html>
- B. oral final examination (Dissertation Defense)
- C. get a job or post-doctoral position
- F. one graduate course(each year) not included in the core requirements
- G. cognitive lunch talk (each year)