

Cognitive Program Handbook

As of 01-20-2025

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Overview

Our Ph.D. students conduct cognitive research under the mentorship of a cognitive faculty member. Below, you will find how a typical student might proceed through the program. Students should consult the program requirements for all expectations and activities.

Throughout:

- Attend all departmental colloquia and cognitive dissertation defenses.
- Attend all Cognitive Talk Series sessions and present once per year.
- Present relevant findings at national/international research meetings.
- Submit relevant findings for publication.
- Contribute to program, department and/or school citizenship.

Year 1:

- Engage in first-year research project.
- Complete core statistical sequence (2 courses).
- Take Foundations of Cognitive Psychology (PSY 2410).
- Work toward completing three cognitive and three open electives (at least two non-cognitive, one with strong methods / advanced statistics component).

Year 2:

- Form Master's thesis committee.
- Complete and defend Master's thesis proposal.
- Complete and defend Master's thesis.
- Receive permission from Master's thesis committee to continue.
- Work toward completing three cognitive and three open electives.

At some point from second year on:

- Teach at least one class and document teaching proficiency.
- Take a course on teaching: University Teaching Practicum (FAC-DEV 2200; offered fall and spring) or Teaching of Psychology (PSY 2970; offered each fall)

Year 3:

- Continue ongoing research.
- Form Specialty Paper committee.
- Complete and defend Specialty paper proposal.
- Complete and defend Specialty paper.
- Receive permission from Specialty Paper committee to continue.
- Finish completing three cognitive and three open electives.

Year 4:

- Form dissertation committee.
- Complete and defend dissertation proposal.
- Continue dissertation work.
- Take or audit one course to stay current with literature or deepen knowledge of statistical/methodological tools.

Year 5:

- Complete and defend dissertation.
- Complete any requested dissertation revisions (if necessary).

- Take or audit one course to stay current with literature or deepen knowledge of statistical/methodological tools.

Please note that the specific sequencing of cognitive and open electives will vary based on course availability and individual student plans. Similarly, the year for each milestones might vary (see departmental guidelines for expected timelines).

Support for Students

The Advisor is the primary point of contact for students, but we have a number of formalized roles where other faculty are available to talk about anything a student wishes. They will keep conversations confidential if you request, but please note that faculty are [mandated reporters](#) for certain issues.

- **Advisor** – A student’s advisor is often the first point-of-contact for concerns. If a student feels uncomfortable talking about an issue with their advisor, or would just like additional perspectives, all the people below have agreed to discuss any issues with graduate students.
- **Mentoring Committee Chair** – As a member of your mentoring committee, this person can work with you on matters that you might not wish to raise with your advisor. This might include career matters, difficulties that may have occurred with advisor/advisee interactions, or anything else. If you request it, this conversation can be confidential.
- **Mentoring Committee Member** – The third member of your mentoring committee is also available to offer advice and to meet.
- **Program Chair** – The Cognitive Program Chair is here to talk about program matters, either in general terms (e.g., handbook questions) or about your particular situation.
- **Director of Graduate Studies** – The DGS oversees graduate studies across programs and is often involved in individual student matters. As such, they are here for any department-level concerns or if you would prefer to speak to them, rather than the people above.
- **Chair of Psychology Department** – As a member of the Psychology Department, you are welcome to book a meeting with the department Chair to talk through any issues.
- **Psychology Department Climate Ambassadors** – The Psychology Department’s two Climate Ambassadors are cross-program advocates who have taken on this role because they believe in improving the department climate and helping any members of the department.
- **Ombudsperson for graduate students in the School of Arts & Sciences** – The Ombudsperson has been described as the “chief troubleshooter” for graduate students. By being outside the department, this person can give advice to a student, and also is able to follow-up on concerns outside of the departmental structure. By having a wider view of multiple departments, they also have knowledge of the university system in a way that departmental members do not.

1. General Goals and Philosophy of the Program

The purpose of the program is to train students in the research and teaching of cognitive psychology. The program provides training leading to a PhD in psychology, preparing students for jobs in academic and nonacademic settings. Students are encouraged to complete the program in five years, though some students take longer due to additional coursework and the nature of their research projects.

As the highest academic degree conferred in recognition of scholarly and scientific expertise, a Ph.D. implies specialized expertise, broadly related knowledge, and a commitment to scholarly and scientific inquiry. The training program uses an apprenticeship model to impart this expertise, this knowledge, and these values. Students work with faculty members, under close supervision, on research programs throughout their graduate careers. Over time, students acquire increasing independence as researchers. Within this model, broad knowledge and commitment to inquiry are promoted in an integrated program that includes basic coursework, seminars, colloquia, and conferences. Students are expected to participate fully in the intellectual life of the program, and to take advantage of the many opportunities for learning in the broader university setting. Given that expertise, broad knowledge, and a commitment to inquiry are most valuable when they can be communicated successfully, the program additionally places a strong emphasis on learning to communicate one's expertise and discipline knowledge. Student presentations of research and teaching promote these two goals, respectively. Teaching experience occurs both informally, through mentorship of undergraduate student researchers and junior graduate students, and formally, through undergraduate instruction in classroom and instructional laboratory settings. Students receive support in developing their teaching skills through coursework, institutional resources, and faculty supervision.

The student's most important training is learning to carry out significant publishable research under the guidance of a primary advisor. The advisor will assist the student in learning the diverse skills of research, writing, presenting, etc. Although all students will work under the direct apprenticeship of a primary advisor, many students may find it useful to also collaborate with other members of the faculty.

Important: The Dietrich School of Arts and Sciences Graduate Dean's Office governs paperwork and procedures concerning, for example, admission to doctoral candidacy. Students should consult [Arts and Sciences Policies & Procedures](#) for this information, as well as the Arts and Sciences Graduate Handbook (available on the right of that page). Student should also be familiar with the Psychology department's graduate handbook, which Psychology graduate students across all programs are required to follow.

2. Expectations for Graduate Students

2.1 Overview of expectations

To gain the specialized expertise, broadly related knowledge, commitment to scientific inquiry, and communicative abilities that are the goals of the program, students are expected to:

- Expeditiously and effectively complete the course requirements.
- Adhere to the departmental recommended schedule for completing the first year project, Master's thesis, specialty exam (also known as 'comprehensive exam' or 'comps') and dissertation.
- Regularly submit papers for publications, including first-authored papers in major refereed journals.
- Present papers at national and international meetings (departmental funds available).
- Be active contributing members of both the cognitive program and the psychology department, including regularly attending all departmental colloquia, volunteering for committees, assisting in new student recruitment, etc.
- Attend the Cognitive Talk Series each year. **Only** pre-dissertation-proposal students should formally enroll in the Cognitive Talk Series each year, though all should attend.
- Attend all Cognitive dissertation defenses, with encouragement to attend defenses by students in other programs.
- Give a local research presentation, such as a Cognitive Talk Series talk, every year. Although presentations should be research oriented they need not report fully completed projects.
- Document teaching proficiency by teaching at least one class during their graduate tenure (with satisfactory teaching ratings). Most students, however, will engage in more than one semester of teaching.

Although the goal of the highly selective and careful admission process is to select students who can and will complete their degrees, it is possible that some students will find they are not suited for completing a PhD in cognitive psychology.

2.2 Participation in program, department, and school operations

It is expected that students will be active members of our community by assisting with new student recruitment and volunteering for opportunities to have input on program, department and school policies, and operations. Joining a committee and/or helping with an initiative not only helps influence and better our community, but is an excellent way to build valuable experience in collaborating toward shared goals, navigating the interests of multiple stakeholders, and helping with logistical challenges. This is particularly valuable for the CVs of students considering careers in industry, where prospective employers value examples of an applicant working as part of a group, and of management experience.

3. Course Requirements

Course offerings reflect central questions and research areas in cognitive psychology and related cognitive sciences. These include traditional topics, such as learning, reasoning, memory, and language, presented in their most current formulations (but reflecting their historical development) by faculty who are actively conducting research in these areas.

3.1. Departmental requirements

The following course requirements must be met by all students in the department:

- a. **Core statistical sequence.** Two courses (6 credits) in quantitative methods that teach the general linear model and its associated procedures, i.e., analyses of variance and regression. Students are encouraged to complete the statistics requirement in their first year, though the specifics of course offerings may delay completion until the second year. Students entering with a Master's degree may be exempted from one or both of these courses. To be exempt, a student must consult with the instructors of the department's courses regarding overlap between the student's previous courses and the department's courses. If an instructor approves a waiver, the student must forward an email from the instructor documenting the waiver to the Program Chair and the Psychology Graduate Office.
- b. **Teaching in Psychology.** All students are required to successfully complete a course related to teaching university courses, either University Teaching Practicum (FAC-DEV 2200; offered fall and spring) or Teaching of Psychology (PSY 2970; offered each fall). The teaching-course requirement should be completed either before or concurrently with a student's initial teaching experience.

3.2. Cognitive program requirements

At least seven additional courses are required to complete training in the Cognitive Psychology program, as detailed below. Students who joined the program before 2024 have the option of following an old course model (included below).

3.2.1 Cognitive Core course. This is a one-semester (3 credit) core course (PSY 2410, Foundations of Cognitive Psychology) covering the basic content of cognitive psychology from the perspective/frameworks emphasized at the University of Pittsburgh. Only in very rare circumstances will students entering with a Master's degree be exempted from this course.

3.2.2 Two focus content-based (i.e., not methods) seminars (totaling 6 credits) that are as close as possible to the student's particular research area. In some cases, this could include non-psychology courses, such as Linguistics for students researching language. The student's mentoring committee is to be consulted to agree on which courses fall under this category.

3.2.3 One breadth content-based (i.e., not methods) seminar (3 credits) outside a student's research area, in order to expose students to topics outside their particular sub-field. The student's mentoring committee is to be consulted to agree on which courses

fall under this category. This may include CNBC courses if relevant (e.g., cellular neuroscience if this does not fall into a student's sub-field)

Students entering with a Master's may petition the Program Chair to have prior graduate coursework in cognitive psychology count towards one of the courses in 3.2.2 or 3.2.3. If the Program Chair approves this, the student should forward an email from the Chair to the Psychology Graduate Office, which documents this waiver.

3.2.4 Three other courses of any kind. This can include CNBC and/or Quant-minor requirements.

3.2.5 Examples of how two fictional students might meet their cognitive course requirements (beyond the Foundations course). Note that one student's 'focus content-based seminar' is another's 'breadth' because the students are researching different topics. Each student's Mentoring Committee will have reviewed and approved the courses falling in each category.

Example 1: Jodie uses eye-tracking to understand how we process semantic and syntactic features during reading.

- Her two focus content-based seminars could be:
 - One or two language-related courses from the Cognitive Psychology program (such as the Advanced Seminar in Reading by Dr. Perfetti)
 - A relevant course from the Linguistics Department
- Her one breadth content-based seminar might be one of:
 - A cognitive faculty's graduate course offering (e.g., Cognitive Neuroscience of Learning & Memory)
 - A non-methods graduate course offered by the another program area or department
- Her three-of-any-kind might include:
 - methods courses (e.g., eye-tracking, how to analyze time-course data, machine learning, etc)
 - other content courses at Pitt or CMU.

Example 2: Raul uses fMRI to understand episodic memory. He is also in the CNBC Certificate Program.

- His two focus content-based seminars could be:
 - The Cognitive Neuroscience of Learning and Memory
 - A graduate seminar in Statistical Learning at CMU
- His one breadth content-based seminar might be one of:
 - A cognitive faculty's graduate course offering (e.g., Advanced Seminar in Reading)
 - A non-methods graduate course offered by the another program area or department (e.g., Neuroanatomy)
 - CNBC Cognitive Neuroscience core course
 - CNBC PDP core course
- His three-of-any-kind might include:
 - Machine Learning

- CNBC Cellular Neuroscience core course
 - Advanced Seminar in Neuroimaging
- etc.

3.3 Expiring cognitive program requirements (old model) - available to students that joined the program prior to 2024:

3.3.1. Cognitive Core course. This is a one-semester (3 credit) core course (PSY 2410, Foundations of Cognitive Psychology) covering the basic content of cognitive psychology from the perspective/frameworks emphasized at the University of Pittsburgh. Only in very rare circumstances will students entering with a Master's degree be exempted from this course.

3.3.2 Cognitive electives. Students are required to take three seminars/advanced courses (totaling 9 credits) with a cognitive focus. Content-oriented, methods-oriented, and statistics courses can be acceptable if they have a strong cognitive focus. Direct inquiries about whether courses can count as cognitive electives to the Program Chair. Parallel Distributed Processing is the only Center for the Neural Basis of Cognition (CNBC) core course that currently has a strong enough cognitive focus to count as a cognitive elective. The CNBC Cognitive Neuroscience core course can count as an open elective. Students entering with a Master's may petition the Program Chair to have prior graduate coursework in cognitive psychology count towards one of the cognitive electives. If the Program Chair approves this, the student should forward an email from the Chair to the Psychology Graduate Office, which documents this waiver.

3.3.3 Open electives. Students are required to take three semesters (9 credits) of additional graduate level coursework. These courses can be taken in any department or program. Students entering with a Master's may petition the Program Chair to have prior graduate coursework outside of cognitive psychology count towards one of the breadth courses. If the Program Chair approves this, the student should forward an email from the Chair to the Psychology Graduate Office, which documents this waiver.

3.3.4 Breadth constraint. At least two of the seven electives must have a focus that is not cognitive. Breadth courses can be content-focused, methods-focused, or quantitative courses that go beyond the two-semester departmental statistics sequence.

3.3.5 Methods/statistics constraint. At least one of the seven electives must be a methods or advanced statistics course (e.g., Advanced Regression, HLM, Computational modeling, Advanced fMRI, PDP, ERP methods). Students who participate in a methods-intensive workshop (25+ hours) can petition to have this experience satisfy the methods/statistics constraint.

3.3.6 Coherence constraint. Students should consult their mentoring committees to help plan a coherent set of elective coursework that complements their research interests (e.g., cognitive neuroscience, higher level cognition, language and the brain, language and reading, educational neuroscience). For some students, this coherence may come from participation in joint training programs, such as the CNBC training certificate.

3.4 Additional expectations

Students who are taking full-time dissertation credits are expected to take one course per year to keep current with the literature, or to deepen their knowledge of statistical and methodological tools relevant to their field. This course may be officially audited instead of taken for a letter grade. This requirement can be waived if a student's advisor or mentoring committee agree that not taking on an additional course would be better for a student's particular situation.

3.5 CNBC certificate

Students in the CNBC certificate program are responsible for completing all of the requirements of both the Cognitive Psychology degree and the CNBC program, but many of the required CNBC courses can satisfy the requirements above. Depending on the specific set of cognitive psychology coursework that is chosen by a student, this can allow the CNBC certificate to be completed without an overall increase in coursework (see the [CNBC course requirements web page](#) for information about courses and additional requirements of this concentration).

3.6 Satisfactory performance

Students must obtain a 'B' in courses that are required by the department, content-based focus or breadth courses (or 'cognitive electives' under old model), and core course in cognitive psychology. All other courses must fulfill the Psychology Department's minimum of B- (see the graduate handbook for more). Students who do not meet these minimums will have to re-take the relevant course or demonstrate competency with the course material via an alternative mechanism decided on by the original course instructor and the Program Chair. CNBC students will need to meet the [CNBC program's grade minimums](#) to remain in the Certificate Program.

4. Research Requirements

The following are the specific research requirements necessary for earning a Ph.D. in cognitive psychology. Successful graduate students will typically supplement these requirements with additional research, writing, and collaborations. Successful graduate students will also typically seek to publish the outcomes of their research.

Students can access a OneDrive directory of checklists of procedures for how to prepare for proposals and defenses, as well as examples, by contacting the Program Chair.

4.1 First-Year Research Project

During the first two terms, the student works on a research project under the supervision of the advisor. Typically, the first-year project will largely or entirely involve working on an ongoing project in the advisor's laboratory. Students will present their progress on their first-year project as part of the Cognitive Talk Series at the end of their first year. The First-Year Research Project is intended to fully engage the student in a research environment early in the training program; it often forms the basis for the Master's thesis equivalency (4.2).

4.2 Master's thesis equivalency

By the end of their second year, students are expected to have proposed, and ideally completed, a Master's Thesis Equivalency in psychology. The Master's Thesis Equivalency gives the student an initial exposure to the steps that are required to design, implement, and publish a research project. Successful completion of this milestone typically indicates that the student has the skills to progress towards greater research independence.

4.2.1 Master's thesis proposal. Typically during the first year, the student obtains approval from their advisor to form a Master's thesis committee of at least three members. The committee is chaired by the student's primary advisor, and must include at least one other member of the cognitive program. Committee members do not have to be part of the graduate faculty, but must have a faculty appointment. The student should distribute a written proposal for a Master's research project to their Master's committee, and schedule a meeting to be held 1-2 weeks later. Proposals should range from five to ten pages, and should include a literature review, proposed methods, planned analyses, expected outcomes, and significance of the research. The proposed research should have original contributions, although Master's thesis projects often closely align with research projects established by the student's advisor. Often, the proposal derives from work completed as part of the First-Year Research Project.

Ideally, the intended work is proposed as soon as a solid empirical objective and paradigm have been developed, but prior to the acquisition of data. In some cases, a student may have made substantial progress on data acquisition or even data analysis; this most often occurs when progress on the first-year project has been more rapid or productive than anticipated. Such progress does not preclude the student from proposing the work, although Master's committees are not obligated to accept the proposed project.

The purpose of the proposal meeting is to evaluate the overall merit of the Master's research project, and to make recommendations for changes in the framing, design, analysis, and interpretation of the proposed research. The meeting typically begins with a brief (10-15 minute) oral summary of the proposed project by the student, followed by questions from the Master's committee members. At the end of this meeting, the Master's committee either approves the proposed research, or provides guidance concerning what steps might be taken to gain approval.

4.2.2 Master's thesis document. Ideally, the Master's thesis research and write-up should be completed during the second year. The contents of a thesis should correspond to that found in a published article in an empirical journal that publishes similar work. The expectation is that this document will serve as a foundation for a manuscript that can be submitted for publication following the successful defense of the work. To facilitate this transition, the Master's thesis should be submitted in the submission format required by a target journal named in the document, following requirements for length, reference formatting, sections, appendices, keywords, etc. Short, high-impact journal submission formats (e.g., Nature, Science, Psychological Science) are acceptable if the work is a plausible submission to that journal. The Master's thesis should include the cover letter to the editor, also following any journal-specific expectations (e.g., naming of reviewers, testifying to IRB status).

4.2.3 Master's defense. Copies of the Master's thesis must be distributed to the committee two weeks before its defense. One week prior to the defense, the student should ask members of the committee for approval of the defense schedule. During the Master's thesis defense, the student will typically present the work to the committee (the duration of this presentation should be discussed with the advisor). Following the presentation, the committee will ask the student extensive questions. Typically, some revisions of the thesis are required before a final version is approved. The Master's committee is also required to confirm that a student should continue in the program (see 4.2.5. Terminal Master's for more details).

4.2.4 Mechanisms. We imagine three different pathways through the Master's equivalency, all designed to facilitate students' completion of a project that is of journal submission quality.

4.2.4.1 The default path. The default mechanism is for the student to propose a Master's to a committee by the end of the first year, defend the Master's by the end of the second year, and then submit the paper to a journal, possibly following some revision (e.g., new writing, new analyses, new data).

4.2.4.2 Alternative project. In the second path, the student proposes a Master's to a committee, but the Master's project itself has some setbacks, while they have achieved some strong success in a second empirical project (possibly started before the Master's project) that has been conducted in parallel to the Master's. Ideally, these projects will be presented to the faculty prior to their submission to, or acceptance at, a journal. The student can petition to have this project count as the Master's Thesis Equivalency, but there must be an oral defense of the project as in the first path. The student may use the

Cognitive Talk Series as the presentation, however, the student must arrange a separate private meeting with the committee following the presentation.

4.2.4.3 Project from prior Master's. In the third path, some students may arrive in the program with a Master's thesis written in other programs. If this document has a high likelihood of being accepted for publication in a strong peer-reviewed journal (related to the topic of cognitive psychology), such a document might serve as an equivalent for a Master's thesis. The first step in this path is to give a presentation in the Cognitive Talk Series on the project, and then follow-up with a meeting of the mentoring committee (or three other program faculty if a different set of expertise is more appropriate for the given project). At this point, the project could be accepted, rejected, or require a follow-up oral defense.

4.2.5 Terminal Master's. Satisfying the Master's equivalency milestone is a demonstration that the student has the basic skills, intellectual capacity, and personal motivation that are necessary to successfully complete a Ph.D. dissertation. At the end of the Master's defense, the Master's committee will first decide whether to accept the Master's equivalency as acceptable for a Master's thesis. In rare cases, the Master's committee may judge that the student's overall progress in the program is not acceptable, even if they have successfully completed the requirements for a Master's degree. In this case, the Cognitive Program Faculty would as a whole determine whether the Master's degree should be a terminal degree for the student, or whether the student should be allowed to continue in the program.

4.2.6 Formal recognition of a Master's degree. Students interested in the formal award of a Master's degree must follow [University procedures to properly format and submit an approved thesis document](#) (Check with the Graduate Office of the Department of Psychology for details). The receipt of the Master's degree is also contingent on completion of the following subset of the course requirements outlined above: the cognitive foundations course, the statistics sequence (two courses), and 21 additional credit hours. Additional credit hours can be fulfilled by the following: graduate courses (including credits attained through cross-registration at other universities and from other schools at the University of Pittsburgh, e.g., Education), no more than 12 credits of upper level undergraduate courses (designated course number > 1000), Master's thesis (maximum 6 credits), and directed study. Please note: independent study and undergraduate courses with designated course number < 1000 do not count towards the minimum requirement for an M.S. degree.

4.3 Specialty exam

Following completion of the Master's thesis equivalency, the student is expected to continue their engagement in several research projects, while also moving the Master's work towards publication if possible. This work during the second and third years helps define the specific interests of the student, and allows the student to become an increasingly independent investigator. The specialty exam, typically completed at the end of the third year, gives the student the opportunity to critically examine the literature in their area of interest in order to develop a deep conceptual understanding of the theories and

open research questions that will be relevant for their dissertation research. In addition, the exam serves a more general training function. Students need experiences that exemplify the kind of sustained, reflective, problem-oriented scholarship that is consistent with their professional development goals.

The specialty exam also serves an evaluative function. It allows the faculty to assess the student's mastery of a specialized topic and to judge the student's preparedness for a dissertation. The student's comprehensive knowledge of relevant psychological topics will have been assessed in courses and seminars. In addition to this broad topical knowledge, the student needs to demonstrate mastery of a specific set of related problems. This mastery implies an in-depth knowledge of a research literature. Passing the specialty exam demonstrates that the student knows the theories and research methods that have developed around a set of related problems, and can articulate the central current issues that they address.

It is expected that the student will continue to engage in other activities during the specialty exam, especially when the exam overlaps two terms. Taking a seminar, working on a research project, or teaching a course are examples of other activities that a student should perform while writing the specialty paper.

4.3.1 Format. The specialty exam consists of a scholarly paper written on the student's specialty problem. The paper can be envisioned as a review paper that is of publishable quality. It should contain a critical, novel, coherent, and up-to-date review of a body of published papers in a focal area. A critical review is one that not only refers extensively to literature in some problem area, but also comments on the unsolved problems and methodological issues that have characterized the work on the problem. The paper should take a distinctive and new focus on the issues being reviewed, and not merely describe studies. For example, it should organize the research in a useful way, posing specific questions, etc. A typical length would be 45-55 pages plus references (assuming large font (size 11 or 12), conventional (1-1.5 inch) margins, double-spaced). The length of the paper shall not exceed 70 pages (double spaced) excluding references, except as agreed by the faculty committee in response to a request by the student. The reference list should be substantial (seven to 10 double-spaced pages of references would be typical for most papers).

4.3.2 Specialty exam proposal. The student chooses a specialty problem in consultation with their advisor. A two to four page prospectus describing the problems to be addressed in the paper is prepared along with a 3-5 page reference list. The reference list at this point is representative of the core literature to be reviewed rather than the complete list that will be part of the paper. The prospectus and reference list together comprise the specialty exam proposal. In addition, the student is encouraged to identify, and prepare to discuss, two to three published review papers that will serve as models for the style and approach that the student will take in their own paper. When the advisor approves the proposal, the student forms a specialty exam committee comprised of three or more members. The committee is chaired by the student's primary advisor, and must include at least one other member of the Cognitive Program. Committee members do not have to be part of the graduate faculty, but must have a faculty

appointment. The student sends committee members a copy of the proposal and schedules an initial meeting. During this meeting, the faculty present oral comments to the student concerning the proposal. These comments can help the student focus more clearly on the problems to be addressed and can raise areas of review that should be added to the proposal. If the proposal is accepted, the student then formally begins the specialty exam (4.3.3). If the proposal is not accepted, the committee provides guidance concerning what steps might be taken to gain approval.

4.3.3 The specialty exam process. The specialty exam typically consists of three phases: 1) a reading period, 2) an initial writing period, and 3) a revision period that culminates in a final draft of the specialty exam. The specialty exam committee typically meets at the end of each phase to provide focused feedback to further develop the manuscript, and ultimately to evaluate the final product.

4.3.3.1 Reading period. The specialty exam begins with a reading period, which is usually four weeks in duration. This time is spent largely in an absorb-and-synthesize mode, during which the student spends the bulk of their time reading the materials, and jotting down key ideas and organizational schema. Ultimately, the student drafts an outline for the specialty exam, and a 5-10 page summary of key points. This outline and short summary is then distributed to the specialty exam committee.

4.3.3.2 Writing period. Following approval of the specialty exam outline and short summary, the student typically is given four weeks to write a draft of the specialty exam. This paper should be a best-effort paper of the quality one would be willing to send to a journal. (It is not to be considered a "rough" draft, but a polished paper.) The paper may not be publishable, but it should reflect competence in scholarship, including writing, and some mastery of the issues addressed. It is expected that this draft could be improved via revision, as usually happens when papers are submitted for publication. Following this initial writing period, the student should distribute the draft of the specialty exam paper to each committee member. The members of the specialty exam committee are expected to provide both a written and oral critique of the document.

4.3.3.3. Revision period. Following approval of the initial draft, the student is typically given two weeks during which to make revisions to the specialty exam paper. The revision typically should include a letter to the committee (modeled after a letter included with a resubmission of a publication) that details the revisions and how the committee's suggestions were incorporated. At the end of the revision period, the final version of the specialty exam paper should be distributed and an oral exam should be scheduled. At the exam, the student is questioned about the problems addressed in the paper. The committee can be expected to probe the student's knowledge of issues and literature that are related to the topics covered in the paper, even when they are not actually discussed in the paper.

4.3.4 Duration. Once a specialty exam proposal has been approved, the student ideally will require only 10 weeks of effort to complete the exam – i.e., the sum of a four-week reading period, a four-week initial writing period, and a two-week revision period. This time frame excludes the time between the end of the reading, initial writing, and final revision periods that typically will be necessary for specialty exam committee members to read and

evaluate the student's written material. Ideally, all of these meetings should be scheduled at the beginning of the specialty exam, with faculty given 3-10 days to evaluate the materials at each step. With these interim periods included, the specialty exam will typically extend across a 13-16 week interval. This means that the ideal starting time is often the beginning of the semester; the summer of the third year is viewed as an ideal time for the substantial start-up work, e.g. writing the proposal, though it is not necessary to follow this suggested timing.

The specialty exam committee has the authority to extend or modify the timing of the different phases of the specialty exam. For instance, a student may petition to have a four-week reading period, a three-week writing period, and a three-week revision period. Or, a student may ask for the clock to be stopped for a short time during the specialty exam period so that they can prepare for and attend a conference, engage in a short phase of intense data collection, etc. Additionally, it is possible that the faculty may not approve the student to progress from one phase to the next without further modifications to be completed within a specified time frame. Such occurrences are expected to be rare, and the total amount of time given to the student to work on the specialty exam may not exceed 15 weeks, excluding the time required for faculty feedback.

4.3.5 Alternative mechanism. During the course of training it is hoped that students will be successful in getting papers published in refereed journals. In recognition of the importance of this component of graduate training, students may substitute papers submitted for publication in lieu of a completing a specialty exam. Specifically, one significant first-author review article may be considered as equivalent for the specialty exam.

This pathway is similar to that for the traditional route. First, the student must form a specialty exam committee, formally propose the specialty exam equivalency to that committee, and gain approval for their plan. The precise format of the proposal will be at the discretion of the committee. Students must defend the review paper proposal before beginning writing in earnest. When the work is completed, students must defend the proposed equivalent work before their specialty exam committee.

4.3.6 Passing and failing. It is expected that most students who have progressed through the program beyond completion of the Master's thesis milestone will be able to successfully complete the Ph.D. program. However, it is possible to fail the specialty exam. In such an event, the specialty exam committee formulates a recommendation that is forwarded to the Cognitive Program Faculty. The program faculty as a whole will determine the consequences of failing the specialty exam; potentially, a student can be given another opportunity to satisfy the requirement, or the student's participation in the program may be discontinued.

4.3.7 Relation of the paper to the dissertation. There is no prohibition against the student drawing from the text of the specialty exam in writing the dissertation.

4.3.8 Faculty role when the student is working on the paper. It is expected that discussions with committee members as well as other faculty and students will occur while the student is working on the paper. Such discussions, which characterize the way scholarly writing proceeds generally, are presumably a useful part of the specialty paper

process. The only prohibition of help is that faculty should not be asked for comments on drafts of the paper or parts of it prior to the paper's completion and distribution.

4.4 The dissertation

The dissertation, typically proposed and completed during the fourth and fifth years, marks the end of the student's apprenticeship. The dissertation must be an original project. Although the dissertation may, and often will, relate to the advisor's research, it must represent a clearly distinct line of inquiry.

4.4.1 Proposal. The student, typically during the fourth year, obtains approval from their advisor to form a dissertation committee. The University of Pittsburgh sets requirements for this committee. The dissertation committee, chosen by the student and advisor, must consist of at least three graduate faculty from the Department of Psychology and one from either the graduate faculty of another department of the University or the faculty of another university. (Note: Not all faculty are graduate faculty so the student should contact the Psychology Graduate Office to determine the status of faculty before finalizing the committee. Also, prospective committee members from other universities must be approved by the University of Pittsburgh (contact the Psychology Graduate Office for necessary paperwork). The student should submit a written prospectus for a dissertation research project to the dissertation committee. The proposal must be approved at a meeting of the committee. Approval should be e-signed by each committee member shortly after the proposal is accepted. Following the meeting, the student must apply for Ph.D. candidacy to the FAS Graduate Dean's Office. The format of the proposal is described below next to each dissertation track.

4.4.2 Dissertation. The cognitive program has two dissertation tracks:

4.4.2.1. Track 1. The first follows a traditional path where a student conducts the proposed research studies, as outlined in their approved Dissertation Proposal. This proposal should be submitted in a grant proposal format, using the format that is most relevant to the student's area. Acceptable choices include: NIH NRSA Predoc (default for cogneuro and some language students), NSF DDIG (possible for linguistics and human-computer interaction projects), and Spencer dissertation fellowship (education related projects). The exact formatting guidelines should be used, including font choice, text spacing, and page length. Only the core proposal document is required: NIH project summary, project narrative, and bibliography; NSF project summary, project description, and cited references; Spencer background information, abstract, narrative discussion, and work plan. Stimulus materials, survey copies, and the like may be added as appendices. Students may petition the Program Chair to submit in other grant agency formats if these agencies are more relevant to the student's work, the length is consistent with what is expected in a dissertation proposal, and the dissertation committee is in agreement. The prospectus should be 10-15 single-spaced pages (depending on the agency), and must include a literature review, proposed methods, planned analyses, expected outcomes, and significance of the research.

4.4.2.2. Track 2. Alternatively, with permission of their dissertation committee, students can opt to bring together a set of first-author papers that have each been (at least)

submitted to a journal or preprint server. Note that papers with shared first-authorship (with two or more co-first-authors) are ineligible because dissertation chapters must be the primary work of the PhD student. The inclusion of preprint servers (e.g., PsyArXiv; BioRxiv) allows students to pursue this track even after obtaining results that are not statistically significant, while encouraging distribution of non-significant results in the field. The particular number and nature of papers that can make-up the core of the dissertation is ultimately approved by the dissertation committee but will typically number three. In extremely rare cases, where many experiments are contained within one paper, two papers may be approved. Similarly, four could be required in cases where a paper is short (e.g., brief report). These papers cannot have been used to fulfill the requirements for the Master's or Specialty Exam milestones. In addition to these core chapters, students following this track must also have a substantial Introduction and Discussion that integrates the theories and results from the core chapters. This Introduction and Discussion text can draw on the student's Specialty Paper (as long as the text has not already been incorporated into individual study chapters) but must also integrate the material with studies in the dissertation. In order to have early input on the dissertation, the dissertation committee should be formed as early as possible, and at least one of the proposed papers is expected to be pre-data collection (for studies that collect new data) or pre-analysis (for studies analyzing existing data) at the time of the Dissertation Proposal meeting. The dissertation committee has discretion to accept or reject potential papers, and to approve or reject whether the selected papers form a suitably cohesive whole.

For creating the proposal, the student and advisor should first discuss whether the default format (below) would work for the student's particular situation:

- Part 1: An overview of research literature that establishes the nature/importance of the overall dissertation topic, and then clarifies the research gaps that then become the focus of the three studies.
- Part 2: Paper 1 as-is.
- Part 3: Paper 2 as-is OR progress so far / plans for remaining steps.
- Part 4: Paper 3 progress so far / plans for remaining steps. Studies not yet complete can be written up in a grant proposal format (dissertation grant or regular grant depending on whether one can be submitted).
- Part 5: Initial thoughts on emerging insights that can/could be drawn by looking across the three papers.

If the student and advisor believe that the default format does not seem the most appropriate, they should create a brief (approx. half page) explanation of their suggested alternative format (i.e., a pre-proposal), which must be sent to the committee for approval prior to writing the proposal.

4.4.3 Pre-defense distribution of dissertation. Students are highly encouraged to gain their advisor's approval to distribute their dissertation to their committee. Two weeks before the defense of the dissertation, copies of the dissertation are distributed to the committee.

4.4.4 Oral examination (defense). The final oral examination, at which the student defends the dissertation, is open to the public. For the defense, the student shall arrange a large room, sufficient to accommodate attendance by persons not on the committee; the Martin Room in Sennott Square or Murdoch room 424 in the LRDC is strongly suggested. Announcements of the defense, which should state a title, a date, and a place, must be posted in prominent places (e.g. both LRDC elevators) **at least one month in advance of the meeting**. A copy of the announcement must be given to staff in the Psychology Graduate Office, who must post a notice in the *University Times*.

All students in the program are expected to attend defenses. The defense is scheduled for 3 hours and divided into an open portion and a closed portion. The open portion is about 1.5 hours, beginning with a 40-50 minute lecture by the candidate and followed by an open question period in which all persons in attendance participate. The chairperson of the committee declares the open portion of the defense ended at their discretion. During the closed portion of the defense, only members of the graduate faculty are present; during this period, the student is questioned in depth about their research and relevant findings and how they fit with theories from the literature.

4.4.5 Approval of the dissertation. Approval of the dissertation itself occurs at the end of the defense. If revisions are required, conditional approval can be given at the end of the defense, along with the set of steps that will be required prior to the final approval of the dissertation. Once a dissertation has been approved, the student is encouraged to publish it electronically using the procedures established by the University. If the dissertation is not approved, the Cognitive Program faculty as a whole determine the consequences of failure; potentially, a student can be given another opportunity to satisfy the requirement, or the student's participation in the program may be discontinued.

5. Teaching Requirements

It is expected that many students will go on to careers in academia that will involve teaching and research. To prepare students for this career, the program requires all students to teach at least one lecture-based course or to lead a laboratory or recitation section that requires substantial independent instruction (e.g., a lab section for PSY 0420: Human Cognition).

The first time a student has primary responsibility for a course or section, the student is required to have a faculty supervisor, who meets with the student to discuss the course syllabus, exam materials, etc. A student who wishes to take primary responsibility for a lecture-based course is encouraged to consult with faculty about the possibility of “shadowing” a course, in which one section is taught during the day by a faculty member and a second section is taught in the late afternoon or evening by the student. Ideally, the student and faculty member would work together to prepare the materials for the class. In order for a teaching experience to count toward the teaching requirement, the student must contact the department's teaching supervisor **in advance of the class**. At the end of the semester, the student and teaching supervisor need to complete and submit a Teaching Review Form for the Psychology Graduate Office.

Teaching evaluations are required whenever a student has primary responsibility for a course or section. Copies of these teaching evaluations should be submitted as part of a student's annual self-report. A student's mentoring committee and Program Chair will review the student's teaching performance to ensure that the student has adequate mastery of basic teaching skills. In the event that a student does not perform well in the classroom, additional teaching experience may be required.

6. Evaluation of Graduate Students

Students will be evaluated on the basis of the degree to which they successfully meet the expectations outlined above in a timely fashion.

6.1 Mentoring committee

Each student will be assigned a mentoring committee of at least three faculty from the cognitive area. This committee advises the student concerning curriculum, provides oversight to the student regarding general progress in the program, and serves as a mentoring resource for the student. This committee has the responsibility of providing the student with a realistic assessment of performance, including putting the student on provisional status if appropriate. In order to facilitate communication and to avoid potential conflicts of interest, the chair of this committee cannot be the student's research advisor. Although there is likely to be overlap with committees associated with the program milestones, this committee is independent of all other committees.

6.2 Self-reports

Each spring, each student must submit a self-report form to the department that indicates relevant training activities, including papers written and presented, courses taken, skills acquired, etc. Each student should also include an updated Curriculum Vita. As noted above, teaching evaluations from the current year should also be included.

6.3 Evaluations

First year students will have a fall and a mid-year meeting with their mentoring committee to provide them with some early feedback on their progress, and to address any initial difficulties that may have arisen before they become too serious. Students should come to the first-year mid-year mentoring meeting prepared to explain the design and logic of their First-year Research Project, and before their meeting should circulate to their committee members a bibliography of 5 articles that they have read related to their project.

Early each summer, each student is expected to schedule a coaching meeting with their advisor to discuss progress (students may want to use the advisor feedback form to help structure this meeting). In addition, each summer the Program Chair will notify all students to schedule meetings with their mentoring committees. Later in the summer, following these meetings, each student will receive a letter from the Program Chair, detailing the program's assessment of that student's progress.

6.4 Timeline for completing program milestones

Ideally students should complete the program in 5 years, although it is understood that some students may require 6 years, and occasionally take even longer. The Cognitive Program follows the Psychology Department's milestone timeline.

6.5 Program provisional status

Students who are making inadequate progress in the program (failing to meet expectations of the program detailed in sections 1.0-5.0 or failure to comply with the Psychology Department's milestone timeline) will be put on provisional status within the program. Provisional status is determined by the Program Chair in concert with the student's mentoring committee, and in some cases the Cognitive Program faculty. Students on provisional status will be re-evaluated at the end of each semester in order to determine whether provisional status might be lifted or whether discontinuation in the program is warranted. It is expected that a student on provisional status will meet with the mentoring committee at the end of each term to discuss the student's status and plans. A student on provisional status is advised to have very explicit discussions with the mentoring committee in order to be very clear about what will be required for them to be taken off provisional status. A student who is on provisional status for two semesters is likely to be put on University Probation status, which eliminates the potential for support. Students under provisional status should carefully consider whether their status may stem from a lack of commitment to the program, and thus whether they might be best served by pursuing other career options. It is important to remember that graduate school is not the best course for everyone, and recognizing an ill fit as soon as possible is in the best interest of everyone, especially a student who would be better off pursuing an alternative career. Once a student has been removed from provisional status, they will be expected to maintain appropriate progress towards the program training goals.

6.6 Expected success

The program recognizes that completion of the program requirements involves a great deal of time and commitment on the part of every student. The Cognitive Program faculty is dedicated to do everything we can to enable each student to succeed. Our faculty treats mentoring as a major responsibility and are genuinely dedicated to launching students on successful careers. We have graduated and successfully placed hundreds of students, and remain committed to ensuring that all students discover their potential in the exciting field of cognitive psychology.