Princeton University
Department of Psychology

Independent Work in Psychology
An Overview of the Junior Paper and Senior Thesis
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Psychology: Portrait of a Department

The Department of Psychology focuses on the study of people’s thoughts, feelings, and behaviors as well as on issues in animal cognition and behavior. Faculty members in the department conduct research and teach on a variety of psychological topics, including (but not limited to), how people’s beliefs and behaviors are influenced by situations, how people make judgments and decisions in situations of conflict and uncertainty, how people see the world and pay attention, how computer models can help in uncovering brain function, and on the neurobiological mechanisms underlying sensory processing, cognitive control, and decision making.

As a major in the Department of Psychology, you will be given the opportunity to take courses that expose you to various topics and broader areas in psychology. Specifically, you may take courses in (1) Social, Personality, and Clinical Psychology; (2) Developmental and Cognitive Psychology; and (3) Cognitive and Behavioral Neuroscience. In addition, as a major in the department, your independent work will generally fall into one of those three broad areas. Given that the department has strong ties to other units within the university, Psychology majors often work on topics that connect to other programs, including Neuroscience, Cognitive Science, Computer Science, Sociology, Anthropology, and Biology.

Psychologists employ a wide range of methods and techniques to address psychological questions. The faculty members in our department are no exception. Faculty use experimental design, field studies, functional neuroimaging (fMRI), reaction time analyses, and computational modeling to answer psychological questions. As a psychology major, you will be exposed to these methods and techniques in courses and gain valuable hands-on experience with some of them via your junior and senior independent work. For instance...

You may follow in your peers’ footsteps and conduct a field study to explore social contagion in social media (senior thesis by Jennifer Dannals titled, "#SheProbablyAHoodRat if she loves her alcohol": An Examination of the Role of Arousal and Perceived Endorsement in Propagating Social Contagions on Twitter) or perhaps use an experimental design to find out how awareness of one’s mental health diagnosis impacts others’ actions and perceptions (senior thesis by Rosmeilyn Jerez titled, "The Depression Confession: How Disclosing a Student’s Depression Diagnosis Impacts the Actions and Perceptions of School Teachers").

If you are trained to use functional neuroimaging, then you can explore whether neural networks are associated with neurodivergence (senior thesis by Margaret Kasey Pecsok titled, “Implications of Inattention”) or examine how we represent complex stimuli on a neural level (senior thesis by Peter Johnson titled, “A Shared Space in Thought: Similarity Approaches to Analyzing fMRI Data”).

Regardless of your specific area of interest, you will learn a wide variety of methods and techniques that will allow you to explore your psychological research question in great depth.

The faculty members in the psychology department serve as mentors and advisers, available to discuss their research with you and to advise you on original thoughts and ideas for your independent research. Specific information about each faculty member’s research interest is listed on the departmental webpage at: https://psych.princeton.edu/people/faculty
Independent Work in Psychology

Overview of Independent Work

During your junior and senior year in the Department of Psychology, you will learn:
1. How to identify and frame an open scientific question.
2. How to select, organize, and critically analyze relevant primary scientific literature.
3. How to select the appropriate methodological design and statistical analyses to test a question.
4. To develop clear and well organized written and verbal presentation of the material, including:
   a. Definition of a topic.
   b. Statement of the plan of the paper.
5. To develop and demonstrate independent thought, which can be shown by:
   a. Creativity in selecting or organizing the material to be discussed.
   b. Clear communication of original ideas or questions. Original ideas can include, but need not be limited to, suggestions for empirical work or further study.

Although these goals will be emphasized during your junior and senior years, developing the tools for research begins well before independent work via the prerequisite coursework required to declare a major in Psychology.

One of these prerequisite courses, Psychology 251 (or an approved equivalent course from another department), teaches basic research methods, with a focus on study design and statistical data analysis. These skills will help you evaluate and analyze published studies as you read scientific literature related to your research question. They may also help you design your own studies and data analysis.

In addition, you must take two foundational psychology courses¹ to ensure that you acquire a diversified background and understanding of the types of scientific questions posed in psychology. These skills will help you identify psychological topics to pursue in your independent work that are especially interesting to you.

In the fall semester of your junior year, you are required to take PSY 300, a course on research methods. Although this course is not itself a part of the independent work, it is an important step in preparing you for it: building upon the required prerequisite statistics class, PSY 300 helps you further develop your foundation in designing experiments and analyzing data, which are essential skills for independent work in Psychology. That is, even if your independent work or thesis does not directly involve experimental design or data collection, this knowledge will improve your ability to evaluate and write critically about prior research that is relevant to your topic. Additionally, because all majors take PSY 300 together in the fall of junior year, this course can also provide you with a sense of community within the department, providing you with a sense for where to go and who to ask when you have questions throughout the course of your independent work.

¹ Please note that we sometimes allow alternative courses to serve as prerequisites, but they must be approved by the Director of Undergraduate Studies.
**Junior Independent Work**

The overall goal of the junior papers (JP) are for you to develop proficiency in reading and analyzing the professional literature in a focused area and to develop an independent project in preparation for a thesis.

As a Psychology major, you will write two JPs to satisfy the junior independent work requirement: the fall semester JP focuses on learning how to review a topic in the scientific literature, while the spring semester JP focuses on learning how to develop a proposal for a novel study that relates to existing literature. For each JP, you will also give a presentation midway through the semester that demonstrates your progress and helps you learn how to communicate your research ideas to others.

**Finding an Advisor**

The first step in your junior independent work is finding a faculty advisor within the first month of the fall semester. The deadlines for submitting your advisor requests to the department are listed on the Psychology Important Dates page (please note: you will repeat this process in the spring semester and again in the fall semester of your senior year). Because these deadlines tend to come up quickly at the start of the year, we recommend that you start this process in the spring semester and again in the fall semester of your senior year. However, if you have trouble finding an advisor, do not worry- the department will help you, and, if necessary, assign an advisor to you.

When you declare Psychology as your major at the end of your Sophomore year, you will meet with the department Undergraduate Program Manager, who will provide you with orientation information and tips on finding an advisor. We recommend that you start considering potential advisors before the end of your Sophomore year and consider contacting some faculty in August. You will also receive e-mail messages early in your Junior year reminding you to search for an advisor.

If you don’t already have a specific advisor in mind, review the Faculty in the Department of Psychology and click on each faculty member’s name to see a concise summary of their research. Please read all of these summaries (it takes about 30 minutes) and make a priority list of those whose who may be a good fit for you.

**What determines a good advising fit?**

Students often match with an advisor based on mutual interest in the same research questions. When the questions being investigated by your advisor make you intellectually excited, the rest of the work is more enjoyable and engaging. Curiosity is a powerful motivator, and your independent work topic should be as interesting as possible to you.

Students may also match with an advisor based on skills they want to acquire via their independent work. If you think there are specific research methods (e.g., field studies, neuroimaging, experimental manipulations) and/or quantitative methods (e.g., advanced data analysis, machine learning, natural language processing) that would be useful for you to learn, consider faculty advisors who use these methods in their labs.
Students also sometimes match with advisors based on a unique style of advising. Your independent work in Psychology allows a great deal of freedom in pursuing different interests and topics, and the faculty also have flexibility in how they advise. Some faculty provide a great deal of structure, with a specific schedule of meetings, progress checkpoints, and deadlines. Other faculty encourage you to be more self-motivated and set your own course of progress, providing support when requested. There is not a one-size-fits-all style of advising, and you should reflect on what works for you. This particular aspect of advising fit is difficult to determine from faculty summaries, so when you meet with faculty to discuss advising, ask about their advising style to see if it fits with how you work best.

When you have your top 3-5 advisor choices, send an introduction email to your first choice to set up a meeting about advising. If you don’t hear back within about 48 hours (at any given time a number of faculty are traveling or on leave or sabbatical), or if you hear back that the faculty member is unavailable (e.g., going to be away next semester or their advising load is already full), email the next person on your list. Repeat as needed.

Faculty are expecting to receive multiple messages from undergraduates about advising, so don’t feel shy or hesitant about sending introduction emails. All of our faculty are passionate about their research areas and your shared interest is very welcome!

**What should you include in your email?**

Because faculty are considering multiple candidate advisees, it helps them to know more about your specific interests and how these interests relate to ongoing research in their lab.

Therefore, in your introduction email, describe what specific ongoing research interests you. To identify this, we recommend that you read articles linked on the faculty’s department or lab page to learn more, or use Google Scholar and filter for articles published in the past 2-3 years by the faculty. On lab pages, we also recommend you review what graduate students and post-docs are working on, as this gives you a good sense for ongoing projects in the lab.

Please know that you do not need to propose original research ideas in this email, as project ideas typically develop as part of JP advising. However, if you are certain about a particular topic that you want to work on, please include this information in the introduction email.

If you start this process early, you’ll typically pair with one of your top few choices. However, the later you begin, the more likely it is that faculty members will already have full advising schedules. By a few weeks into a semester, you might need to email your top 7 or so choices before finding an advisor. In light of this, **please start this process early.** If you still have trouble finding a faculty advisor by mid-September, do not worry: contact the Department of Psychology Undergraduate Program Manager and we will help you through the process.

Please note: if you wish to work in a lab from another department, an advisor from another department may oversee the student’s independent work only if the student has found a primary advisor within the Department of Psychology and obtained permission from that primary advisor, the Psychology Director of Undergraduate Studies, and the potential outside advisor. Then the student must submit written notification to the Undergraduate Program Manager indicating the name and department of the outside advisor.
Fall Semester Paper

The primary goal of the Fall JP in Psychology is for students to practice how to formulate a question and to query the literature. Therefore, the final fall paper should involve critical analysis and original synthesis of the relevant scholarly literature, with a topic chosen collaboratively by student and advisor.

The Fall JP may take many formats. Different advisors prefer different approaches, so make sure to discuss the options with your advisor and clarify what is exactly expected of you.

What are common formats for the Fall JP?

In one common approach, you will find a topic that overlaps with both your interests and your advisor’s expertise. You will research the topic, find the relevant scientific literature, and write a review paper on that literature. However, the literature review must be more than a recounting of what others have done: specifically, the review should formulate an open question of interest and use the literature to support and explore that question.

In a second common approach, some faculty organize a “JP lab,” with many students working together in a discussion group that meets regularly throughout the semester. At the end of the process, you must submit a paper formulating an open question of interest and synthesizing the literature that supports and explores that question.

In a third common approach, you will become a part of a research team, working with your faculty advisor as well as the graduate students and other researchers in the lab group. At the end of the Fall semester, you will be required to submit a paper describing your work to date. The paper should explain the questions being investigated empirically and place them in the context of the larger literature background. You may also include any results you have by that time. The exact format of the paper will depend on your discussions with your advisor.

Although the Fall JP may involve one of these formats, the Department requires that all Fall JPs meet the following guidelines:

- **Length**: The Fall JP should be 10 to 20 pages (about 2,500 – 5,000 words). Longer is not better. You should be able to cover your topic concisely.

- **Sections**: The paper should contain a title page; an abstract (a brief, 100 – 300 word summary); the main text, divided up into sections with headings; and references.

- **Sources**: The paper should include references that cite appropriate sources, primarily published papers in scientific journals. The number of references depends on your topic, but are often between about 10 and 30.

- **APA Format**: The paper should be double-spaced and must be submitted in a journal format that is pre-approved by your advisor. The default format for Psychology independent work is to follow the instructions of the American Psychological Association. The APA Style Manual (reference book format) is available in the Lewis Science Library. Frequently asked questions and general style guidelines can also be found online at APA.org.

The Psychology librarian at the Lewis Library, Meghan Testerman (schedule appt here), is also available to help you with library research. Meghan has also created a helpful guide for Psychology concentrators that covers things like finding literature and APA Style.
Spring Semester Paper

The primary goal of the Spring JP in Psychology is to prepare students for a thesis by having them formulate an original research idea and embody it in a paper. It should be written for a broad, academic audience.

Like the Fall JP, the format of the Spring JP is flexible and depends on discussions between you and your advisor. Different advisors prefer different approaches, so please make sure to discuss the options with your advisor and clarify what is exactly expected of you.

**What are common formats for the Spring JP?**

In one common approach, the Spring JP can be a theoretical piece that proposes a thesis idea and uses creative exploration of the literature to evaluate the idea. This type of JP would look like a mini-thesis or a first pass at a theoretical thesis.

In a second common approach, the Spring JP can be a research proposal. The goal of writing a research proposal is to learn how to read the literature, identify an open scientific question, and design an experiment that might address that question. In some cases, the research proposal lays the groundwork for the Senior Thesis, but this is not required. A research proposal typically includes a comprehensive review of the relevant research literature, a statement of your specific scientific question, a detailed description of the methods you will use to collect data, a description of the statistical analyses you will use, and a discussion of the possible outcomes and their interpretations. It may be useful to include figures diagramming the possible quantitative outcomes.

In a third common approach, a Spring JP might be a write-up of experimental work completed during the Junior year, with separate sections for introduction, methods, results, and discussion (again, like a mini-thesis). Some students may be midway through an experiment by the end of the Spring semester and lack complete results. In that case, the student may write a research proposal, including an introduction that places the experiment in the context of the larger literature, a description of the method, and a discussion of possible outcomes.

Although the Spring JP may involve one of these formats, the Department requires that all Spring JPs meet the following guidelines:

- **Length**: The Spring JP should be 20 to 40 pages (about 5,000 to 10,000 words). Longer is not better. You should be able to cover your topic concisely.
- **Sections**: The paper should contain a title page; an abstract (a brief, 100 – 300 word summary); the main text, divided up into sections with headings; and references.
- **Sources**: The paper should include references that cite appropriate sources, primarily published papers in scientific journals. The number of references depends on your topic, but are often between about 10 and 50.
- **APA Format**: The paper should be double-spaced and must be submitted in a journal format that is pre-approved by your advisor. The default format for Psychology independent work is to follow the instructions of the American Psychological Association. The APA Style Manual (reference book format) is available in the Lewis Science Library. Frequently asked questions and general style guidelines can also be found online at APA.org.
Midpoint Presentations

During the Fall and Spring of your junior year, you will give a 10 to 15-minute presentation midway through each semester to demonstrate your progress on your JP.

Presentations will occur in groups of 4 to 6 students and typically take place the week following Fall and Spring Recess (see Important Dates). Although each individual will present on their JP progress for 10 to 15 minutes, students are expected to stay for the entire session and listen to all group members’ presentations, which takes approximately 1-2 hours. This affords you with the opportunity to learn about a range of topics that your fellow Psychology juniors are working on! In addition to their group members, a faculty member will be present to moderate the discussion and grade the presentations, which collectively count towards 10% of your final JP grade.

In general, your Midpoint Presentation should:

1. Summarize your topic.
2. Describe why it is an interesting topic to write about and how it relates to psychology.
3. Demonstrate progress made on reading and synthesizing the literature.

If your JP includes an experiment in which you are collecting data, you can present preliminary data. However, please strive to be succinct and organized! Your presentation should be strictly within the time limit and stay on topic. You may use slides or other presentation materials and visual aids if you wish, but this is not required.

As you prepare, please keep in mind that, although other students in your group will share a background knowledge in psychology, they may lack expertise in your specific topic. Therefore, you should aim to explain your work a general and accessible manner such that everyone can follow it.

Please remember: like other aspects of the JP, it is important to discuss your presentation with your advisor well in advance. The Department of Psychology Undergraduate Program Manager will contact you early in each semester to schedule your Midpoint Presentation, but you should aim to discuss your advisor’s goals and suggestions for the presentation in one of your initial meetings.

If you are studying abroad for a semester during your Junior year, please note that you will be exempt from the Midpoint Presentation for that semester but are not exempt from the JP.
Senior Independent Work

Each Psychology Senior works in close consultation with a faculty advisor to develop, carry out and write a Senior Thesis that identifies and addresses an open question in psychological science.

Overview of the Senior Thesis

A Senior Thesis in Psychology can take one of three forms: experimental, computational, or theoretical.

An experimental thesis should include a comprehensive review of the literature relevant to the open question, methodological steps taken to address that question, findings from at least one original research study (an experiment or a field study) with appropriate statistical analyses, and a general discussion of the findings.

A computational thesis should include a comprehensive review of the literature relevant to the open question, a description of the computational models that the student has completed to address that question, and a general discussion of what can be concluded from these models with respect to the open question.

A theoretical thesis should include a comprehensive review of the research literature on a psychology topic of importance that demonstrates an extensive evaluation of the findings and original interpretations and includes theoretical proposals or a proposed program of research to advance scientific knowledge on this topic.

The skills you gain in PSY 300 (Research Methods) will be especially useful in completing your thesis. While they are of course necessary if you conduct an experimental thesis, a good grounding in experimental design, data analysis, and data interpretation are invaluable in critically evaluating prior research, a component of all theses in Psychology.

Format of the Senior Thesis

In scientific research, different projects are best accomplished via different approaches. As such, students in Psychology write many different kinds of theses, and the format of your thesis will be jointly decided via discussions between you and your advisor.

For example, a theoretical thesis will aim to critically review previous research on a topic and present the writer’s original thoughts and interpretations of that research. Thus, the exact organization of thesis chapters and subheadings will depend on the topics relevant to that field of research. By contrast, an experimental thesis will involve designing an experiment, collecting data, analyzing data, and interpreting results. This work will be presented in a fairly standard, experimental format that includes an introduction, method, results, and discussion section. Therefore it is extremely important to work with your advisor and discuss exactly how your thesis is best organized.
Although the exact format of the thesis will be determined by the student and advisor, the Department requires that all Senior Theses meet the following guidelines:

**Length**
There is no specific page or word length for the Senior Thesis; this varies by topic and advisor.

**Sections**
The paper should contain a title page; an abstract (a brief, 100 – 300 word summary); the main text, divided up into sections with headings; and references.

**Sources**
The paper should include references that cite appropriate sources, primarily published papers in scientific journals. The number of references depends on your topic; please discuss this with your advisor.

**APA Format**
The paper should be double-spaced and must be submitted in a journal format that is pre-approved by your advisor. The default format for Psychology independent work is to follow the instructions of the American Psychological Association. The APA Style Manual (reference book format) is available in the Lewis Science Library. Frequently asked questions and general style guidelines can also be found online at APA.org.

**Departmental Examination**

Near the end of your Spring semester Senior year, you will present your Senior Thesis to your primary reader (advisor) and secondary thesis reader (assigned in March) as part of the Senior Thesis Departmental Examination. This required presentation typically lasts 1 hour and is held on or around the University’s Departmental Exam dates.

During this 1-hour exam, you will spend 10-15 minutes presenting your Thesis and approximately 45-minutes answering questions about your thesis, its background, and how it relates to other topics in psychology.

The limited presentation time means that you will not be able to present every finding in your Thesis, nor should you attempt to. Like a well-written paper, a clear presentation is one that presents a coherent, easy to follow narrative that is supported by the most relevant points.

To aid your presentation and Q&A, you may wish to use slides to present information. Although most students do use slides during the exam, this is not required and you should do what makes you feel most comfortable. If you do use slides, here are some tips:

- **Pace yourself.** Don’t try to rush through 50 slides in 10 minutes; a good pace is 1 slide per minute.
- **A picture (i.e., graph) can be worth a thousand words.** In a presentation, relevant graphics can facilitate understanding more effectively than a block of text. However, select graphics carefully- irrelevant pictures can be distracting and the audience should be able to understand the meaning of an image without your explanation. One exception to this latter rule are figures- always take a moment to walk your audience through their interpretation.
- **Emphasize take-aways.** While you have been studying your research question for a year (or longer), this topic may be relatively new to your audience. With this in mind, aim to have one to two clear “take-home” points about your topic that your audience should understand after hearing/viewing your presentation.
Planning for the Thesis

Finding an Advisor

Students are encouraged to be proactive in finding and securing a thesis faculty advisor. While most students continue to work with the faculty member who advised them during their Spring JP, this is not required. If you wish to change topics and advisors, you may do so.

To find an advisor, you are encouraged to read the research descriptions of faculty on the Department of Psychology website to identify topics that are of interest to you. You can then contact faculty directly and arrange to meet with them to get a better sense of what they work on. Once you have secured an advisor, you will submit your Senior Thesis sign-up form in the Psychology Independent Work Portal.

Developing your Research Question

It is very common for students to have a (relatively) easy time deciding on a general area or topic of research that they are interested in, but struggle to turn that interest into a specific and testable research question. With this in mind, when generating a research question to pursue in your thesis, the best places to start are the existing literature on your topic of interest and discussions with your advisor.

1. By reviewing the literature, you will determine what is already known about a particular topic, what types of methods are typically deployed to study this topic, and better grasp which specific, relevant questions have not yet been addressed.
2. By meeting regularly with your advisor to discuss your ideas, you will determine how to best develop and revise your ideas into a testable question (or set of questions) and which approaches are best suited to studying this topic further.

For instance, many students join a lab in the Department of Psychology and contribute to that lab’s ongoing program of research during their Junior and Senior year. In that case, the student’s research question evolves from discussions with their advisor and is closely related to other active experiments in the same lab.

Other students elect to pursue a research question that is more independent from their advisor’s ongoing work. In this case, the biggest challenge student’s often face is developing a research question and hypothesis can be properly advised within the faculty member’s areas of expertise and are of an appropriate scale for a Senior independent project. Therefore, in either case, it is extremely important to work closely with your advisor while developing your research question.
Conducting and Writing an Experimental Thesis

While each thesis option is valuable, there are typically more steps to be aware of and more standard formatting to follow when conducting and writing an experimental thesis.

Conducting an Experimental Thesis

After you have identified your specific, open research question and generated a hypothesis, you must design an experiment that can appropriately explore that question and test your prediction. This is an extremely important part of the process that cannot be completed at the last minute, so please keep these steps in mind:

1. **Design:** You should discuss the design with your advisor and make sure the design adequately tests your hypotheses before collecting data. Part of this process also involves identifying the specific statistical tests you will conduct and the appropriate number of participants to gain sufficient statistical power.

2. **Obtain approval:** Before you collect data from humans or animals, you must obtain approval from the University’s Institutional Review Board (IRB) or Institutional Animal Care and Use Committee (IACUC), respectively. See the section below on Resources for additional information about the IRB process.

3. **Data collection:** After you have designed your experiment and received approved from the IRB or IACUC, you will collect your data. In advance, make sure you and your advisor discuss various methods for participant recruitment and data collection, as well as how long data collection may take given your sample size.

4. **Data analysis:** Once the data are collected, you will analyze it and perform appropriate statistical tests to make inferences about your data and determine if the results vary significantly from what was expected by chance. To make your results easier to interpret and evaluate, you will visualize your data in graphical formats. There is a great range of statistical tests, and you will have to discuss with your advisor to decide which is appropriate. Statistical tutoring is available through the Department of Psychology. For more information on tutoring and workshops, contact the Department of Psychology Undergraduate Program Manager.

Regardless of your experimental design, please remember that research does not always go according to plan. For instance, after your experiment has been conducted, it may be necessary to collect additional data. Perhaps some participant data is not useable due to an error in data collection and more participants are required to reach your target sample size. Or, if your results shed light on an interesting phenomenon, your advisor may suggest conducting a follow-up study.

In all cases, we recommend that you start early, be organized, and be prepared for research to take longer than you initially anticipate.
Guidelines for the Written Experimental Thesis

An experimental thesis typically includes four sections:

**Introduction**  
The Introduction presents a comprehensive review of the relevant scientific literature. This comprehensive review should be organized in a clear and coherent manner, presenting a narrative that explains and develops the reader’s understanding of the literature as it relates to your research question.

Your comprehensive literature review will typically include many references, sometimes as many as 50 or more. However, the synthesis of this research is essential for achieving clarify in your writing and coherence among your arguments. That is, you should not discuss every article in exhaustive detail, but instead provide sufficient information to make your point. This may mean that that you describe and cite the main finding for one article or a set of articles (e.g., to emphasize one aspect of your argument) while providing more details on others (e.g., to highlight a contrasting point). By drawing connections between and synthesizing previous research on your topic, your introduction will present evidence in a coherent manner, flowing logically to your closing statements and setting the stage for your research study.

At the conclusion of your introduction, you will briefly, lay out your research plan, describing how your study is the next logical step in the research. Here, you will summarize what your study adds to the literature (i.e., your rationale), how you plan to examine the unanswered question (i.e., brief overview of your method), and what you expect to happen (i.e., your hypothesis).

**Method**  
The Method section provides step-by-step instructions so that someone else could carry out a reasonable replication of your study without your help.

**Results**  
The Results section provides an objective description of your findings. Include descriptive statistics (such as means and standard deviations), inferential statistics (p values and statements of statistical significance), and graphs that display the data as clearly as possible.

**Discussion**  
The Discussion section provides readers with a meaningful commentary about the interpretation, importance, and larger implications of your findings.

When starting your Discussion, it is important to remind the reader of your main hypothesis (i.e., what was it and did your data support it?) and then place your own findings within the context of the prior literature you reviewed in the Introduction (i.e., how does your finding fit in with or relate to past findings?). Last, you will reflect on what could have been done better (i.e., what are the potential weaknesses of your study that you might change if you were to repeat it?) and what future researchers should consider in light of your findings (i.e., how can future experiments gain more insight about the topic?), placing your research in a greater context to show how or why it is important.
Resources

Your Adviser

The adviser is a student’s most important resource. You should meet with your adviser as soon as possible to get started on the independent work and discuss their expectations about your research collaboration.

Below are a few important issues you should consider as you start the collaborative relationship with your adviser.

- **What exactly are the senior thesis requirements?**
  - If they are written down, you may still want to clarify them with your adviser.

- **What is your adviser’s area of expertise?**
  - Consider which parts of your adviser’s guidance you will need for each part of the research and writing process.

- **Can you meet to brainstorm about ideas or get recommendations for reading? Will they read work in progress or only polished drafts? Should you write a cover letter that directs your adviser to questions you have about the written work you submit?**
  - Talk with your adviser to clarify and establish any expectations for the research and writing process that either of you have.

- **Is it essential to meet weekly or biweekly? How many drafts of the paper will your adviser read? When should you submit drafts and when will they return feedback?**
  - Talk with your adviser about your schedule. You are likely to be more productive if you establish deadlines for submission of work and establish expectations for receiving feedback.
  - Consider what you want to accomplish in individual meetings with your adviser. You might suggest an agenda for each meeting.

- **How will you decide which advice to accept and which to reject? How will you negotiate between your vision of the senior thesis and your adviser’s if that becomes an issue?**
  - Anticipate that there may be different ideas about how best to approach your senior thesis topic. Be prepared to defend the decisions you make about the work and your adviser’s feedback.

Library Resources

As a Psychology major, you have access to an extensive collection of books and journals relevant to psychology in the Lewis Science Library. Many databases and journals are also available electronically and can be searched and read full-text from any computer on campus or through VPN or proxy service when off campus. For example, you have access to databases such as PsycINFO, PubMed, Web of Science, Lexis Nexis Academic, Mental Measurements Yearbook, PEP Archive (Psychoanalytic Electronic Publishing), Scopus, MIT’s Cog Net, as well as the Online Catalog, and numerous other information retrieval systems.

Additionally, Meghan Testerman (schedule appt [here](#)), the Psychology librarian at the Lewis Library, is also available to help you with library research. Meghan has also created a helpful guide for Psychology majors that covers things like finding literature and APA Style.
**Writing Center**

Housed in Whitman College, the [Writing Center](#) offers free one-on-one conferences with experienced fellow writers trained to consult on assignments in any discipline.

Special 80-minute conferences are available for JP and Senior Thesis writers, who may sign up to work with a graduate student fellow from the department of their choice.

Daily 50-minute conferences for those at any stage of the writing process are also available seven days a week, with drop-in hours.

**Statistics Tutoring and Consultation**

The Department of Psychology holds ongoing individual consultations on statistical analysis for empirical theses. Participation is voluntary. You will receive emails from the graduate student statistics consultants about how to schedule a consultation.

The University [Data and Statistical Services library](#) also makes statistical consultants available by appointment to help you in downloading, formatting, reshaping, or analyzing data. If you need assistance in identifying and locating data, contact a [subject specialist](#).

**Training for the Ethical Use of Human Subjects/Animal Subjects**

**Human Subjects Certification Program**

Every research institution, including Princeton University, has an Institutional Review Board (IRB) whose purpose is to protect the rights and welfare of human research participants. The purpose, design, procedures, and other features of all proposed human studies must be fully approved by the IRB before they can be conducted. Researchers must complete and submit copies of questionnaires and be certified by completing the Collaborative Institutional Training Initiative (CITI).

Students receive training on how to complete the IRB questionnaire and prepare for the certification in an extensive workshop that is mandatory for those conducting experimental theses. The workshops are offered throughout the academic year, but students will attend sessions only during the weeks in which they are actually preparing and submitting their study applications to IRB. The workshop sessions will guide students through IRB procedures and provide them with detailed supervision and feedback for their particular IRB applications, from start to finish (i.e., from their initial writing of the application until their study eventually receives IRB approval).

**Use of Animals in Research**

All research involving non-human animals must be reviewed and approved by the University’s Institutional Animal Care and Use Committee (IACUC). Students who plan to use animals for their research must contact the faculty member who is supervising the research project in order to abide by both Princeton University and government regulations.
Standards and Grading

Independent work is expected to show independence of thought. When learning of this, students often ask (or wonder), "Just how independent does the thinking need to be?"

Because psychology is a scientific discipline with a large and complex literature, we do not expect students to propose major new theories or make breakthroughs. Instead, for experimental work, independence means that the student has read enough background literature to propose a creative experiment and to design and conduct the experiment thoughtfully without the advisor having to micromanage each step. For a theoretical paper, independence means that the student has read and synthesized the published literature on a topic, summarized it intelligently, and added some thoughtful critique or perspective.

Junior Paper

Junior students receive a single grade on their transcripts in the Spring semester for Fall and Spring independent work, which reflects a combination of the Fall JP (40%) and Spring JP (60%) grades.
- The Fall JP grade is based on a combination of the fall Midpoint Presentation grade (counting for 10%, evaluated by the faculty member present at the presentation) and the final fall paper grade (counting for 90%, evaluated by the student's advisor).
- The Spring JP grade is based on a combination of the spring Midpoint Presentation grade (counting for 10%, evaluated by the faculty member present at the presentation) and the final spring paper grade (counting for 90%, evaluated by the student's advisor).

Senior Thesis

Written Component

The Senior Thesis grade is determined jointly by two readers, the student's advisor and the second reader assigned by the department. The advisor and second reader will confer with each other to determine a final grade for the written component of the Senior Thesis, which will be communicated to the student after the Senior Departmental Exam. The student will receive written comments from both readers ahead of the Senior Departmental Exam. The grade will appear on the transcript as the "Senior Thesis Grade."

Senior Departmental Exam

The primary reader (advisor) and second reader will determine a grade based on the quality of the presentation and the student's ability to answer questions. The grade will appear on the transcript as the "Senior Departmental Exam Grade."
## Grading Categories

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<th><strong>Unacceptable (F)</strong></th>
<th>The student did not submit the independent work or submitted work of such poor quality that it satisfies none of the expectations.</th>
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</table>
| **Minimally Acceptable (D range)** | The student has reviewed some or all of the recommended material or completed some of an empirical study. No independent thought is evidenced. The work has one or more of the following problems:  
1. Coverage of the relevant material is insufficient given expectations that the faculty member established with the student. There is little evidence that the student has critically analyzed the primary literature.  
2. The presentation of the material is poor (lacking organization and/or unclear or incoherent writing).  
3. If experimental, any empirical research is inadequately conducted, given the expectations that the faculty member established with the student. The methodological approach is unacceptable and the interpretation of the data is incorrect. |
| **Adequate (C range)** | Relevant material is covered and reasonably clearly described. Any empirical research is completed and presented in a manner at least partially consistent with expectations that the faculty member established with the student. However, the student does not exhibit independent thought either in bringing the material together or in responding to it. |
| **Good (B range)** | Meets expectations for the assignment. Relevant material is covered. Empirical research is completed consistent with the expectations that the faculty member established with the student. The presentation shows at least some independent thought. However, it lacks complete follow-through or may fail to communicate entirely clearly. |
| **Excellent (A range)** | The student has exceeded expectations in some way. There are clear signs of independent thinking, an attempt to try out new ideas. The student has framed a scientific research question and organized the relevant material in a way that shows support for the question. The student critically analyzes the primary scientific literature. Any empirical research is of high quality, including the use of appropriate methodological design and statistical analyses, and the findings are interpreted and discussed meaningfully. The presentation of the material is clear. |
| **Outstanding (A+)** | The student has presented genuinely novel insights or ideas, well supported by scholarly and/or empirical research, that changes the fundamental nature of psychological theory. The research meets all of the criteria to be published in a top-tier psychological journal. |
Late Policy

Extensions are rarely granted for junior papers or for senior Theses. The criteria include either the student's illness, for which a written medical excuse must be provided, or a family emergency. Extensions must be approved by the Director of Undergraduate Studies and the student’s advisor. For help regarding extensions, students may also ask their residential Dean or the Department of Psychology Undergraduate Program Manager.

If an extension is not granted, a penalty will start to accrue on the student's grade beginning with the day following the deadline. Grade penalties for unauthorized late submission follow a schedule wherein 1/3 of a letter grade is automatically deducted for every 48 hours (or part thereof) that the work is late, weekend days included. Work that is not received within two weeks of the deadline date will be given a grade of F. After the University deadline, no written work can be accepted for a passing grade without approval from the Dean of the student’s residential college.

If either fall or spring junior papers are not submitted, the student will fail the junior independent work for the year. Likewise, if any of the components of the Senior Thesis are not submitted, the student will fail the Senior Thesis work for the year.
Funding for Independent Work

When conducting research for their Independent Work, students may require funding for numerous reasons.
- Some may recruit participants and thus require funding to compensate their expected sample size.
- Some may need to make copies of flyers for participant recruitment or travel to research sites where they are conducting a study.
- Others on financial aid may need to be on-campus during the summer to conduct their research.

For these reasons and more, limited funding is available through a variety of mechanisms for students conducting Independent Work in the Department of Psychology.

Where to Start

As you consider your potential funding needs, please note that the first step in all cases is to design your research project with your advisor. Then, depending on your needs, please consider the following primary sources for funding: your advisor, the Office of Undergraduate Research (OUR), and the Department of Psychology.

The following information and sources of funding pertain to conducting experimental research. If you are seeking funding to attend or present your research at a conference, we recommend that you speak with your advisor and consult the Office of Undergraduate Research’s page on the Undergraduate Fund for Academic Conferences (UFAC).

Primary Funding Sources

Advisor Funding

If you are completing an experiment in a Princeton lab within the context of your advisor’s research, then the first likely source of funding will be your advisor’s lab grants.

Before you apply for funding from the Office of Undergraduate Research and/or the Department of Psychology, please speak with your advisor to determine whether your work will require these additional resources.

Office of Undergraduate Research (OUR) Funding

Through their Senior Thesis Research Funding program, the Office of Undergraduate Research supplies funding during the following periods throughout the year:
- **Summer**: in the spring, *juniors* may apply for funding to conduct thesis research during the summer between their junior and senior years.
- **Fall**: in the early fall, *seniors* may apply for funding to conduct thesis research over the fall break / semester of their senior year.
- **Spring**: in the mid fall, *seniors* may apply for funding to conduct thesis research from December through the end of March of their senior year.
OUR provides a detailed list of expenses covered and the **maximum amount of funding** that may be granted for each. You can review this list on their [Thesis Funding](#) page, under “Expenses Covered.” Additional details regarding eligibility, when and how to apply, and review and award processes can be found on the [Office of Undergraduate Research](#) website.

**Department of Psychology Funding**

The Department of Psychology fund for Independent Work may be used to pay for research participant fees, equipment fees, or supplies. It cannot be used for housing, living expenses, or travel-related expenses.

**Psychology students can receive up to $1,000 in departmental funds in total,** which may be used to support their Senior Thesis, Junior Independent Work, or a combination of the two.

- For example, a student may apply to use their funding during the summer between junior and senior year to pay participants recruited for their Senior Thesis.
- Or, a student may apply to use a portion of their funding during junior year to conduct a pilot study as part of their Junior Independent Work, which may later support their Senior Thesis. Then, they may apply to use the remainder of their funds during senior year to pay participants recruited for the Senior Thesis.

Finally, please note that departmental funding is awarded based on the merit of the proposal and the need for funds. Due to this policy, students conducting research in well-funded labs may be less likely to receive departmental funding.

**Applying for Funding**

If funding from the Office of Undergraduate Research and/or the Department of Psychology is needed, you may apply through the [Student Activities Funding Engine (SAFE)](#) in consultation with your advisor. As a reminder, you will also require IRB approval before you can conduct any research with human subjects. For questions about IRB approval, you may ask our Human Subjects Administrator, [RoseMarie Stevenson](#).

In SAFE, you will find a set of funding opportunities open to Psychology majors. Students should be prepared to submit a full account of their proposed research, a detailed budget, envisioned timeline, and a planned itinerary (if applicable) with their application. Please note that if you apply for the [Office of Undergraduate Research Senior Thesis Research Funding](#) program, you will be required to apply for all departmental and programmatic funds for which you are eligible in **one single application**.

Please keep the Office of Undergraduate Research and Psychology’s respective funding limits in mind when designing your experiment and discuss this with your advisor. It is part of the challenge of practical science to keep the costs down, and we encourage you to take this opportunity to demonstrate your creativity and resourcefulness as a psychological scientist. For example...
You may be able to reduce the number of participants by streamlining the experimental design.
You may be able to borrow laptops or tablets via a University loaner program.
You may be able to access software or cloud storage for free or at a discounted rate via OIT.

Please check SAFE for the time window for submitting proposals and look through OUR’s FAQ help pages for SAFE. The application periods for Psychology funding closely follows the Office of Undergraduate Research Senior Thesis Research Funding cycles (see When to Apply on the Office of Undergraduate Research website).

Additional Information and Funding

If you are curious about additional funding opportunities, we encourage you to check SAFE for other funding opportunities open to Psychology majors. There, you may see opportunities such as those funded by:

- **Center for Culture, Society and Religion**: junior and senior independent research projects in the study of religion.
- **Effron Center for the Study of America**: research in the fields of American studies, Asian American studies, and/or Latino studies.
- **Martin A. Dale ’53 Summer Awards**: sophomore summer funding to pursue project opportunities for personal growth, foster independence, creativity, and leadership skills, and broaden or deepen some area of special interest.
- **Princeton Research in Experimental Social Science (PRESS)**: small-scale experimental projects that include treatment and control conditions that have clear implications for political processes or form a bridge between their home department and politics.
- **Program for Community-Engaged Scholarship**: community-engaged research conducted during the summer between junior and senior year or either semester senior year.

If you have further questions about funding or SAFE, please set up a meeting with the Department of Psychology Undergraduate Program Manager.
## Departmental Contacts

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
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