Annual Academic Assessment Report

B.A. Psychological Science

July 17, 2025

On March 2, 2015, the Department of Psychological Science adopted a plan for the assessment of the undergraduate curriculum in Psychological Science (see accompanying document). The Department identified five major measurable goals that would be evaluated by means of this assessment. These goals were based on recommendations by the American Psychological Association in its publication *APA Guidelines for the Undergraduate Psychology Major.*[1]

1. **Content Knowledge and Applications:** Demonstrate knowledge of key principles, concepts and theories in psychological science both currently and historically and apply psychological science to practical problems
2. **Scientific Inquiry and Critical Thinking:** Demonstrate the ability to reason scientifically, understand and design, scientific research, understand basic statistics relevant to behavioral sciences and think critically.
3. **Values in Psychological Science:** Demonstrate a basic understanding of ethical principles as they apply to psychological research and practice and develop interpersonal and intercultural responsiveness.
4. **Communication, Psychological Literacy, and Technology Skills:** Demonstrate an ability to communicate effectively in written and oral presentations, and exhibit technological skills to improve communication.
5. **Personal and Professional Development:** Exhibit effective self-regulation and professional judgment, demonstrate collaboration skills and career preparation, and manage projects in a work or educational environment.

The Assessment plan called for measuring these goals annually using a combination of direct and indirect methods and for providing a report of findings to the faculty of the Department of Psychological Science and to the Dean of Fulbright College. Data collection for this assessment was carried out starting on the 10th week of the Spring Semester of 2024 and continued until the end of the Semester. This report provides the findings of these assessment efforts.

Assessment of Goals

Goal 1. Content Knowledge and Applications

The first goal identified by the Department concerns ensuring that students have a broad understanding of the knowledge base of Psychological Science. We used two measures to assess this goal as described below.

[1] APA Board of Educational Affairs Task Force on Psychology Major Competencies (2023). APA Guidelines for the Undergraduate Psychology Major (Version 3.0). American Psychological Association: Washington D.C.

Psychology Print Exposure Measure (Smith & Barker, 2008)[2]

Sample: Across the course of two semesters (Fall 2024 and Spring 2025), 209 graduating senior Psychological Science majors, taking Advanced Research or Advanced Seminar, completed this measure. For comparison purposes, 42 General Psychology students also completed the measure (in 2015).

Description: The Psychology Print Exposure (PPE) measure provides students with 50 terms taken from psychology classes (e.g., cognitive dissonance) as well as 50 psychological-sounding foil terms (e.g., proactive sufferance). Students are asked whether these are real psychological terms. Research shows that students with no psychological training score near chance and that performance on this simple 'yes-no' measure strongly correlates with course grades and final exam performance, *r*'s > .68.

Desired Level of Performance: Our goal was that 80% of graduating seniors would obtain scores of 70% or better on this assessment. Seventy-percent correct is considered 'proficient' by the test authors.

Results: Figure 1 shows the percentage of true positives, false positives, and overall accuracy for the graduating seniors. True positives refer to indicating that a term is a real psychological term when it is. False positives refer to incorrectly indicating that a term is a real psychological term when it is not. Total accuracy is simply the percentage of times the student made the correct response to each item.

[2] Smith, D. L., & Barker, L. (2008). Using yes-no recognition tests to assess student memory for course content. Teaching Of Psychology, 35(4), 319-326.

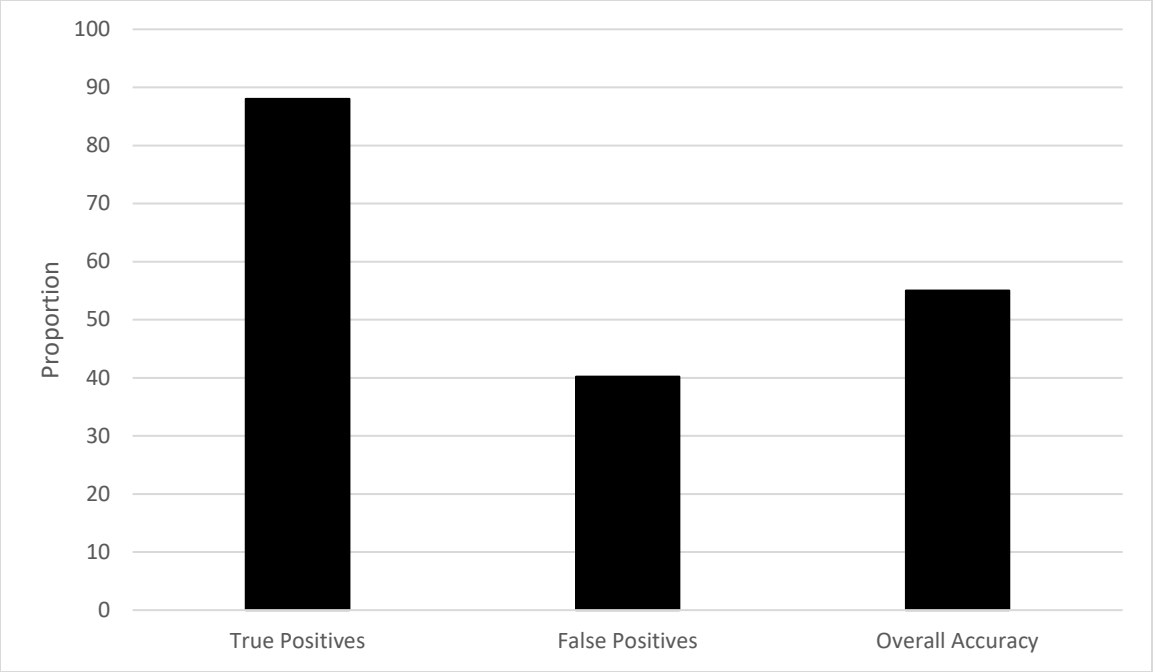


Figure 1. True positive, false positives, and overall accuracy.

Figure 1 shows the percentage of students who scored 70% or better (i.e, proficient). Approximately 55% of graduating seniors scored at the proficient level. This is lower than our goal of 80% proficient, though is somewhat better than last year (which had 42.2% proficiency). Notably, the students were correctly able to almost 90% of the true terms as true, but struggled to recognize when terms were false. These results indicate room for improvement.

Exit Interview

Sample: All graduating seniors were asked to complete an online exit interview. This measure was completed by 41 out of 195 graduating seniors (21.03%).

Description: As part of a formal online exit interview, students were asked to answer a set of questions concerning the degree to which they believed that the classes and experiences they had as part of obtaining a degree in psychological science provided them with knowledge of core areas in psychology. Items were presented in the form of statements. For each student, some items were positively framed (e.g., "My classes and experiences as a major in psychological science have prepared me to understand applications of psychology to the real world.") and some were negatively framed (e.g., "My classes and experiences as a major in psychological science failed to prepare me to understand applications of psychology to the real world."). For each statement students rated their degree of agreement on a 5 point scale ranging from 'strongly disagree' to 'strongly agree.' For positively frame items, responses were coded such that 'strongly disagree' = 1, 'disagree' = 2, 'neither agree nor disagree' = 3, 'agree' = 4, and 'strongly agree' = 5. Negatively framed questions were reverse scored (i.e., a rating of 1 was transformed into a rating of 5, a rating of 2 was transformed into a rating of 4, and so on).

Desired Level of Performance: Our goal was that at least 75% of students would provide ratings of 4 or 5 to each item.

Results: Results of the Exit Interview questions dealing with the core knowledge goal are shown in Table 1. Results are for both positively and negatively framed items, but for ease of exposition, only the positively framed version of the item is shown. As can be seen, well over 80% of the graduating seniors agreed that the undergraduate program in Psychological Science did a good job (rating of 4 or 5) in providing them with content knowledge of Psychological Science.

Table 1.

Percentage of Graduating seniors Giving a 4 or 5 Rating on Exit Interview Knowledge Items

… prepared me to describe key concepts, principles, and overarching themes in psychology	**92.68%**
… provided me with a working knowledge of psychology's key content domains	**85.37%**
… provided me with an understanding of applications of psychology	**87.8%**

Conclusions

In the online exit interview, graduating seniors strongly agreed that their degree in Psychological Science has provided them with a firm grasp of the core content knowledge in Psychology. However, objective knowledge, as measured by the PPE, was lower than expected and not at the proficiency level we expect. This finding was driven primarily by students not being able to detect fake psychology terms, and provides some room for improvement.

Goal 2. Scientific Inquiry and Critical Thinking

The second goal identified by the Department concerns ensuring that students can demonstrate the ability to reason scientifically, understand scientific research, understand the basics of statistics relevant to behavioral sciences and to think critically. We used two measures to assess this goal as described below.

Research Methods and Statistical Knowledge Concept Inventory (Veilleux & Chapman, 2017)

Sample: The measure was given to 209 graduating seniors in Advanced Seminar and Advanced Research during the Fall 2024 and the Spring 2025 semesters.

Description: This measure presents students with a series of vignettes depicting research scenarios and multiple choice questions asking about conclusions that can be drawn about each situation. These vignettes and questions address topics at the heart of research methodology and statistics taught in undergraduate psychology courses, including replication, experimenter bias, operational definitions of variables, correlation, reliability and validity, random assignment, experimental design, confounds, interaction effects, limits to generalizability, and interpretation of statistical findings. To correctly answer each question, students must truly understand the concept, as the foils present empirically derived wrong-answers.

Desired Level of Performance: Our goal was that 70% of graduating seniors in capstone courses (Advanced Seminar and Advanced Research) would achieve 70% or above on this measure.

Results:

We did not meet our goal of 70% obtaining 70% or more on the measure; only 32.1% of the graduating seniors tested (n = 67) achieved a score of 70% or above. However, this rate was more than last year (17.8%). We also found that about 58.9% of these graduating seniors (n = 123) achieved a score of 60% or more, indicating that a substantial number of students obtained scores between 60% and 70% on the measure and thus were near to the goal level.

Exit Interview

Sample: All graduating seniors were asked to complete an online exit interview. This measure was completed by 41 out of 195 graduating seniors (21.03%).

Description: The online exit interview included five questions concerning the degree to which their degree provided them with mastery of methodology and statistical concepts. These items were scored as described above.

Desired Level of Performance: Our goal is that 75% of students would provide ratings of 4 or 5 (as described above).

Results: Results of the exit interview questions dealing with the research methods goal are shown in Table 2. Of the students who responded to the exit interview questions, results are in line with our goals; over 75% of the graduating seniors responding believed that the undergraduate program in Psychological Science did a good job (i.e., moderately or strongly agreed) in teaching critical thinking, scientific literacy and methodological competence.

Table 2.

Percentage of Graduating seniors Giving a 4 or 5 Rating on Scientific Reasoning and Critical Thinking Items

... gave me the ability to use scientific reasoning to interpret psychological phenomena	**80.49%**
... increased my psychology information literacy	**90.24%**
... gave me the ability to engage in innovative and integrative thinking and problem solving	**80.49%**
... gave me the ability to interpret, design, and conduct basic psychological research	**87.8%**
… gave me the ability to incorporate sociocultural factors in scientific inquiry	**82.93%**

Conclusions

Graduating seniors overwhelmingly believed that obtaining a B.A. in Psychological Science helped improved their ability to reason scientifically and to think critically. However, results of a standardized measure of methodological and statistical competency did not confirm this conclusion, suggesting that students are more confident in their statistical and methodological skills than were objectively assessed.

Goal 3. Ethical and Social Responsibility in a Diverse World

The third goal of the Department was for graduating senior psychological science majors to demonstrate a basic understanding of ethical principles as they apply to psychological research and practice. We assessed this goal in two ways: 1) performance of undergraduate students on a

mandatory ethics tutorial and exam, and 2) a set of ethics questions included in an exit interview for graduating seniors. Results from these assessments are summarized below.

Research Ethics Tutorial

Description: We examined archival records of students who had completed the Department's online ethics tutorial and compared those records to a list of graduating seniors. The tutorial is designed such that students complete a final exam at the end of the tutorial. Students are considered to have successfully passed the tutorial only if they achieve a score of 100%. Students are allowed to take the tutorial as many times as needed in order to meet this criteria.

Desired Level of Performance: Our goal was that at least 50% of all graduating seniors will have successfully completed the ethics tutorial, with 80% of those students obtaining a score of 100% on the first try.

Results: Our examination revealed that 81.03% of graduating senior Psychological Science majors had successfully completed the online ethics tutorial and the accompanying test. We did not have first attempt data for all semesters due to changes in how the ethics tutorial was structured. Of those seniors who completed the tutorial in the 2024-2025 year (which was 104, or 53.33% of the graduating seniors), 90% scored 100% on their first attempt. These results are all consistent with the goals outlined in the department's assessment plan.

Exit Interview

As described previously, a formal online exit interview was given to a sample of graduating seniors. A component of this exit interview was a set of questions designed to assess the degree to which their classes and experiences provided them with adequate training and experience in research ethics and social responsibility. Four such ethics items were presented in on the exit interview (Table 3). Details regarding the scoring and framing of these items is described in a previous section of this document. The percentage of graduating seniors providing a rating of 4 or 5 for ethics items on the exit interview is summarized in Table 3. We met our goals on all items, where graduating seniors felt that the department helped them cultivate and maintain ethical decision making.

Table 3

Percentage of Graduating seniors Giving a 4 or 5 Rating on Exit Interview Ethics Items

…provided me with the ability to apply ethical standards to evaluate psychological science and practice.	**87.8%**

…helped me learn how to build and enhance interpersonal relationships.	**75.61%**†
…helped me to adopt values that build communities at local, national and global levels.	**78.05%**
…helped me to respect the values of others who are different from me	**87.8%**

Conclusions

Graduating seniors strongly agreed that obtaining their degree in Psychological Science improved their ability to apply ethical principles to research and practice and increased their respect for diversity. In addition, more than 80% of our graduates had successfully completed an online research ethics tutorial with a score of 100%.

Goal 4. Communication

The fourth goal identified by the Department concerns improving student's communication skills. We used three measures to assess this goal.

Advanced Research Final Paper

All papers submitted to Advanced Research in Spring 2024 were coded using a scoring rubric published by the Society for the Teaching of Psychology (Gottfried et al. (2007).[3] The scoring rubric included 18 criteria. Each criterion was scored on a 4-point scale (inadequate, minimally adequate, adequate, exceptional). Our goal was, that for each criteria in the grading rubric, 75% of students would score adequate or above. Results on each of the criteria are shown below in Table 4.

Table 4.

Mean Score and Percentage of Graduating seniors Receiving Scores of Adequate or Exceptional on Their Senior Writing Requirement in Advanced Research.

	Mean (SD)	% 3 or greater

[3] Gottfried, G. M., Johnson, K. E., & Vosmik, J. R. (2009). Assessing Student Learning: A Collection of Evaluation Tools. *Society for the Teaching of Psychology*.

Title Page	3.23 (1.15)	90.91
Abstract	3.27 (1.58)	81.82
Intro: Topic & Content	3.09 (0.61)	86.36
Intro: Lit Review	3.64 (0.58)	95.45
Intro: Lit Advance	3.36 (0.49)	100
Intro: Hypothesis	3.68 (0.57)	95.45
Design	3.09 (1.38)	68.18
Method: Participants	4 (0)	100
Method: Materials	3.64 (0.58)	95.45
Method: Procedure	3.86 (0.47)	95.45
Data Reduction	4 (0)	100
Results: Descr Stat	3.41 (0.59)	95.45
Results: Infer Stat	3.68 (0.48)	100
Discussion: Interpretation	3.86 (0.35)	100
Discussion: Evaluation	3.82 (0.39)	100
References	3.95 (0.21)	100
Sci Writing Style	3.68 (0.48)	100
APA Style	3.14 (0.64)	86.36

Results indicated that students are doing a generally competent job writing in APA style.

Honors Theses

We examined the results of honors theses submitted by students in the Department of Psychological Science. Each honors thesis is graded by the student's committee on a 9 point scale. Our goal was that at least 70% of psychological science honors students would obtain a thesis score of 5 or higher on their thesis defense. Additionally, students can be awarded honors cum laude, magna cum laude, or summa cum laude. Our goal was that 50% of psychological science students receiving honors would obtain magna cum laude or higher.

In the 2024-2025 academic year, there were 34 Honors students who completed honors theses, with an average score of 7.30 (SD = 1.33). This year, 97.05% (n = 33) graduating honors students received a score of 5 or above. This was far above our goal of 70% obtaining scores of 5 or higher.

In total, 85.29% (n = 29) received magna cum laude or higher, with 47.06% (n = 16) earning magna cum laude, and an additional 38.24% (n = 13) obtained summa cum laude. This exceeded our aspirational goal of 50% of students obtaining magna cum laude or higher.

Figure 5a shows the mean thesis score for our students over the last two years. Figure 5b shows the percentage of students receiving thesis scores of 5 or higher. Last year, in 2024, approciately 64% of graduating honors students received thesis scores of 5 or higher on their thesis defenses with a mean score of 5.94 (SD = 2.27). Our scores this year were quite a bit higher.

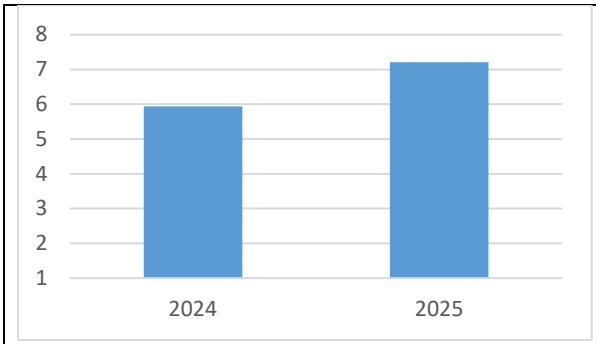


Figure 5a. Mean thesis defense scores over the past two years.

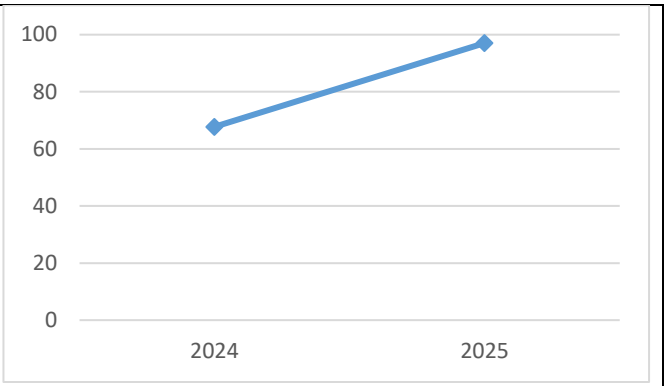


Figure 5b. Percentage of students receiving thesis scores of 5 or higher over the last five years.

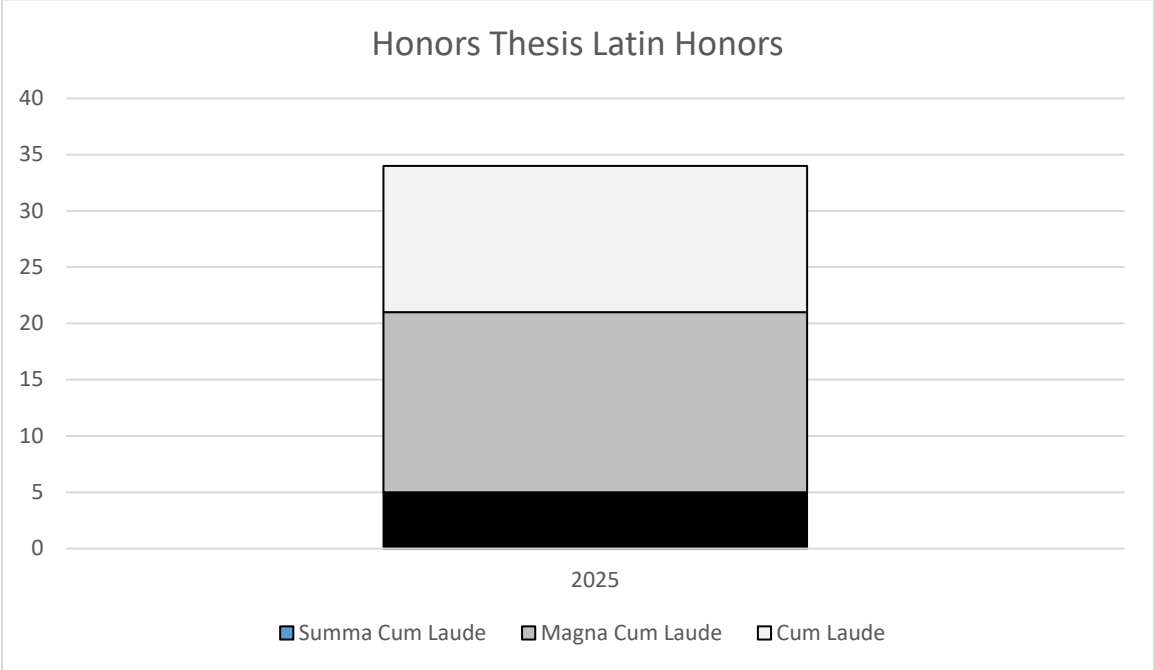


Figure 6. Number of psychological science honors students receiving cum laude, magna cum laude and summa cum laude.

Exit Interview

Three exit interview questions concerned the degree to which students believed that they developed communication skills in our program. Results of the Exit Interview questions dealing with the communication are shown in Table 5. As can be seen, well over 75% of the graduating seniors responding agreed that the undergraduate program in Psychological Science did a good job (i.e., rating of 4 or 5) in helping them to improve their writing skills and skills interacting

with others. Students were slightly less convinced (63.41% provided ratings of 4 or 5) that the program improved their oral communication skills.

Table 5

Percentage of Graduating Seniors Giving a 4 or 5 Rating on Exit Interview Communication Items

… helped me to improve my writing skills	**85.37%**
… helped me to improve my oral presentation skills	**63.43%**†
… helped me to improve my ability to interact effectively with others	**73.17%**

†Denotes an item that failed to meet the departmental goal of 75% on individual exit interview items.

Generally, we met our aspirational goals for the exit interview questions dealing with communication. For both writing skills and interaction with others, more than 75% provided ratings of 4 or 5. For oral communication, we were slightly below our aspirational goals.

Conclusions

Graduating senior Psychological Science majors generally agreed that the degree improved their communication skills. More than 75% of students agreed that the program improved their writing and interpersonal communication skills. A majority of graduating seniors indicated that the degree improved their oral communication skills, however, the percentage agreeing (63.41%) was lower than our goal of 75%. Students in our Honors program are successfully defending their honors theses, with more than 50% of Honors students are graduating Magna or Summa Cum Laude. We also had the goal that 70% or more would have thesis scores of 5 or above, which we exceeded, with 85.29% of honors students obtaining 5 or higher on their thesis. A review of research papers submitted in Spring 2025 indicated that on a majority of criteria, more than 75% of the papers were judged to be adequate or exceptional. The one exception to this general trend is the design section. A majority were rated as acceptable, but the percentage was lower than our aspirational goal of 75%.

Goal 5. Professional Development

The fifth and final goal of the Departmental undergraduate assessment was to determine if advanced undergraduate students (specifically, graduating students) demonstrate the ability to apply skills learned to enhance teamwork, career preparation, and manage projects in a work or educational environment. We assessed this goal by examining graduating seniors' responses to questions concerning their post-graduate plans on an exit interview. We also examined how they responded to questions asking about the degree to which their classes and experiences in the department contributed to their professional development. The results of these assessments are summarized below.

Exit Interview

Description: To better assess professional development, the exit interview included questions about post-graduate plans, whether the student had a job lined up, whether the student had been accepted to graduate school, medical school, law school, etc. Additionally, graduating seniors were asked to answer a set of questions concerning the degree to which they believe the classes and experiences aided in their professional development. These items were scored as described above.

Desired Level of Performance: Our goal is that 75% of students will respond 'agree' or 'strongly agree' to the positively worded questions and 75% of students will respond 'disagree' or 'strongly disagree' to the negatively worded questions.

Sample: We had 41 graduating senior psychology majors complete the exit interview.

Results:

We did not meet our goal regarding seniors' responses to professional development questions on the exit interview. For three of the five exit interview questions related to professional development (see Table 7), students responded with a rating of 4 or 5 more than 75% of the time. Students did not agree that the program helped them develop meaningful professional direction after graduation or help them improve their self-efficacy and self-regulation.

Table 7

Percentage of Graduating Seniors Giving a 4 or 5 Rating on Exit Interview Professional Development Items

… helped me to apply my new knowledge and skills to my career goals.	**75.61%**
… helped me to improve my project management skills.	**80.49%**

… helped me to develop meaningful professional direction for life after graduation.	**65.85%**†
… helped me to improve my self-efficacy and self-regulation skills.	**70.73%**†
… helped me to improve my teamwork.	**75.61%**

†Denotes an item that failed to meet the departmental goal of 75% on individual exit interview items.

During the exit interview, we asked graduating seniors about their post-graduate plans, whether the student had a job lined up, whether the student had been accepted to graduate school, medical school, law school, etc. Results are shown in Figure 8.

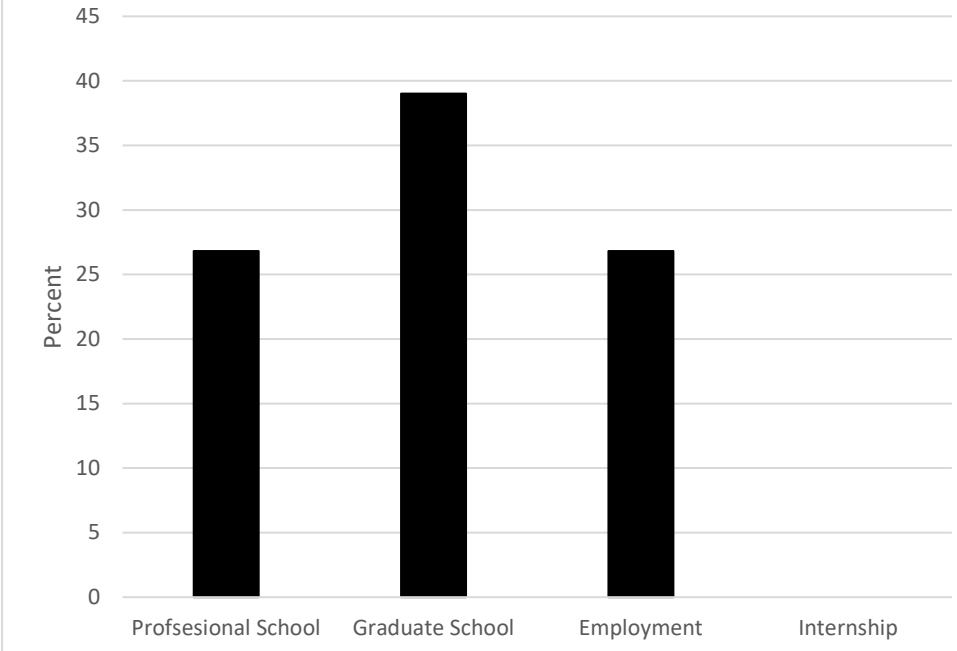


Figure 8. Post-graduation Plans of Graduating Senior Psychological Science Majors.

Around 40% of our sample indicated that they intended to attend graduate school following graduation and over 25%% indicated that they planned to attend a professional school (e.g., Medical School, Law School, etc.). In response to the question asking whether they had been accepted to a school already, 17 of 41 (41.46%) students responded 'yes' and 28 of 47 (24.39%) students responded 'no'. Of the students who indicated that they intended to directly enter the workforce following graduation, 4 of 11 (36.36%) reported that they had already accepted a job.

Of the 17 students that reported they had been accepted to a school after graduation, 7 reported that they were accepted to University of Arkansas, 4 reported that they had been accepted to UAMS, and the remaining students reported that they had been accepted to 11 other institutions, and only 1 student reported acceptance to multiple institutions. Of the 17 students who had been accepted to a school after graduation, 15 (88.24%) students reported that the institution they had been accepted to was their first choice. Two of those 17 students (11.76%) reported that they would be receiving a stipend in their program, 11 (64.71%) reported that they would not, and the remaining 5 (29.41%) reported that they were not sure. When asked if they had been awarded any fellowships or scholarships to attend graduate/medical/law school, 7 (41.18%) of those 17 accepted students reported yes, 10 (58.83%) reported no, and 4 (23.53%) reported that they were not sure. When asked if they received guidance from psychology department faculty in applying to graduate /medical/ law school, 13 (76.47%) responded that they had. Of the 17 students accepted to a program, 9 reported that they would be attending a masters degree program, 2 reported they would be attending a doctoral degree program, 3 reported going to law school, and 1 to medical school. The remaining 2 did not provide enough information to determine the degree that would be earned. Five of the 17 students reported they would be pursuing a graduate program in a field related to clinical psychology/counseling psychology/clinical mental health. Three of the 17 students reported they would be attending graduate programs in industrial/organizational psychology.

Conclusions

The results for professional development were mixed. Many of our students intend to attend graduate or professional schools and some have already been accepted into a program, with most of those achieving their first choice. Students also had a good deal of success directly entering the workforce. On the other hand, the results of the exit interview suggest that students did not uniformly believe that the Department did a good job in attending to their professional development.

Conclusions and Recommendations

The undergraduate assessment plan adopted by the Department of Psychological Science calls for the annual assessment of the undergraduate program and that the results of the assessment be reported annually to the Department and to the Dean of Fulbright College. As part of the action plan adopted by the Department, each Fall following the assessment the Undergraduate Curriculum Committee, in conjunction with the Undergraduate Assessment Committee, will review the results of the assessment and make recommendations for any needed curriculum changes based on the results of the assessment.

The results of the present assessment suggest that the Undergraduate Curriculum and Undergraduate Assessment Committees should consider addressing the following issues in particular. Because of the process outlined in the assessment plan, we withhold making specific recommendations for change – leaving that instead to the appropriate committees and the Department as a whole. Instead we simply highlight important findings that the Department should address.

Program Strengths

The Department of Psychological Science is highly regarded by graduating seniors. The general pattern to emerge from this assessment is that the Department received high ratings in terms of providing students with (1) Knowledge of Core Psychological Concepts, (2) Knowledge of Scientific Reasoning and Critical Thinking, (3) Understanding of Ethics as it Applies to Research, Practice and Diversity, and (4) Written and Interpersonal Communication Skills.

Additionally, on some the objective performance measures used in the assessment, our graduating seniors performed at or above our aspirational goal level. We far exceeded our goals for completion of the department ethics tutorial, and our honors students were very successful in graduating with high honors (e.g., magna cum laude or above).

Program Weaknesses

The most dramatic area of weakness identified in this round of assessments concerned the assessment of scientific reasoning and critical thinking, where our graduating seniors performed below goal levels. Although the seniors reported in the exit interview that they felt capable of understanding research and in their knowledge of psychological concepts, their objective performance did not reach our standards. Of note, the scores on the PPE and the PRIC are substantially lower now than they were prior to the COVID-19 pandemic, which suggests that potentially the group of students in college now are not as capable of learning and retaining information as they were before, perhaps due to learning lapses and extensive online learning conducted during the pandemic lockdowns. We did see scores on both the PPE and the PRIC increase since last year's assessment, suggesting an upward trajectory in our scores. Alternatively, both the PPE and the PRIC are relatively new measures without published norms, and it may be that our goals are too high. The PPE in particular suggests the need for a broad view of psychological science, and it may be that students in our program get more specialized knowledge based on the courses that they take. In the future we may consider additional options for objectively assessing psychological knowledge that may take different trajectories of students into account.

There are also areas where our students felt, according to the exit interview, that the program fell short. For example, many students did not believe that we helped improve their oral communication skills, helped them cultivate self-efficacy, or that we provided meaningful guidance for life after graduation. Although we met our benchmarks of 75% or more in other areas of professional development, the scores were close to that, suggesting that some students are also not satisfied in other related areas such as teamwork or other professional skills.

We note that the scores this year are consistent with scores in past years which were the impetus for our curriculum revision. The students graduating now completed the prior curriculum and thus we have not yet seen how our new course, namely the Careers in Psychology course that is now required for majors, may help students feel more prepared for life after graduation. Although the exit interview indicated that many students who had applied to graduate and professional schools had attained guidance from faculty mentors in this process, such guidance was largely informal and not part of the curriculum per se. We expect that the scores on these measures will change as more of our students shift over to the new curriculum, which was guided largely by evaluations of this annual assessment in years past.

Appendix

Print Exposure Test. Below, 100 terms are listed. Some of them are key psychological terms that you encountered in lectures and reading textbooks. Others will be unfamiliar to you, because they are bogus, fabricated terms that sound like psychological terms, but are not "real" psychology terms. Your task is to identify which of the terms are real and which are fabricated. For example, terms such "memory" and "Ivan Pavlov" are both associated with psychology, so you would mark "Yes". Likewise, "intestinal myopia" and "terminal distress" are not part of psychology, so for these terms you would mark "No." Please look at each item, then select "YES" if you recognize it as a real term, and "NO" if you think the term is bogus. **(Terms Presented Randomly)**

transduction

action potential

self-actualization

secondary reinforcer

cognitive dissonance

critical period

token economy

chunking

factor analysis

standard deviation

Jean Piaget

morpheme

longitudinal study

Intrinsic motivation

transference

normal distribution

serial position effect

fixation

dendrite

attachment

Big 5 personality factors

shaping

general intelligence (g)

James-Lange theory

myelin sheath

synapse

schema

null hypothesis

crystallized intelligence

obsessive compulsive disorder (OCD)

proactive interference

double blind study

temperament

assimilation

unconditioned response

dark adaptation

operational definition

circadian rhythm

activation synthesis hypothesis

fundamental attribution error

conversion disorder

psychophysics

William James

sensorimotor stage

introspection

episodic memory

cognitive-behavioral therapy

biofeedback

systematic desensitization

phenotype

adolescent amnesia

Id therapy

schema taking score (STS)

Henry Barnes

involutional study

polar cell

semantic loop

dendritic hypo-potential

superstitious relaxation

antisocial facilitation

functional flexibility

neurostasis

motivational intelligence

hapless motivation

sleep activation

multiple deviation

proto-operational stage

neutral correlation

retrograde memory

tetrogen

latitudinal study

somatic transmission

psychotransference

biological watch

instinctual deprivation

indifferent schizophrenia

unconscious neuroticism

successful approximation

psychogenic amnesia

toddler-directed speech (TDS)

terminal stasis

Language Imprinting Device (LID)

Bronski's area

unsystematic sensitization

threshold of non-relativity

bystander apathy effect (BAE)

insensitive period

spontaneous salivation

Festinger-Maslow effect

California-Binet test

interdependent variable

duozygotic twins

phobic malingering

fractionalism

conditional restriction

intersubjective validity

operant encoding

post-modern structuralism

latent gratification

objective well-being

Research Methods and Statistical Knowledge Concept Inventory (Veilleux & Chapman, in prep)

On the pages that follow, you will see a variety of scenarios and questions related to research methods and statistics in the behavioral sciences. Please read each scenario closely and select the best answer from the choices that follow. Please answer ALL questions.

When Monica's son Peter was diagnosed with autism, she went to the internet to research the causes of autism after reading some statistics about how both the number of vaccines children were receiving is increasing and autism diagnoses are also on the rise. She found a website with an experimental study that showed a higher rate of autism in boys who had the Measles, Mumps & Rubella (MMR) vaccine compared to boys who didn't have the vaccine. She tells her husband, "I knew it! We never should have had Peter vaccinated."

Do you agree with Monica's opinion/conclusion based off the evidence she found?

- ❍ Her conclusion is incorrect; her opinion is based off of one study. She should look at other studies to see if others find the same result.
- ❍ Her conclusion is incorrect; she has no knowledge about the credibility of the researcher.
- ❍ Her conclusion is incorrect; her opinion is based on one virus. Just because autism increases from the MMR vaccine does not mean all vaccinations cause autism.
- ❍ Her conclusion is correct; experimental evidence is given to demonstrate a causal link between vaccination and autism
- ❍ Her conclusion is correct; even if the statistical probability of autism occurring from vaccination is low, it is best not to take any chances

Javier is a graduate student studying social psychology. He designed a survey to assess how views on homosexuality may be related to religiosity. He measures the strength of his participants' religious views and also measures the extent to which participants dislike the practices of individuals who identify as homosexual or bisexual. After entering the data from the set of surveys, Javier is perplexed because none of his participants reported having any biases or prejudice towards homosexual or bisexual individuals. He is especially perplexed because his survey was given to a wide range of participants (in terms of age, gender, race, and socioeconomic status) and he expected to find more varied responses from these participants.

Can you think of a reason that might explain why none of Javier's participants reported bias towards homosexual individuals?

- Participants may have not wanted to appear prejudiced against homosexuals.
- This generation is more accepting of homosexuality than previous generations.
- This could just be a chance occurrence that his participants do not have any prejudice or bias.
- There is no evidence that religiosity and views on homosexuality are related.
- The participant sample may have included a large number of homosexual or bisexual individuals.

To test how willing people are to help others, researchers design an experiment in which one of the lab's research assistants, Magda, intentionally falls off of her bicycle in front of people on a college campus. Every time she does this, other research assistants (Colin, Freddie, and Rhonda) observe the scenario and record whether people attempt to help Magda when she falls down. Colin counts a behavior as helping when someone approaches Magda or lifts the bike for her. Freddie counts a behavior as helping if a person asks Magda if she needs help. Rhonda only records a behavior as helping if someone physically helps Magda up.

Is there a problem with how helping behavior was measured in this study?

- Yes, because the way helping behavior was measured was not consistent among raters.
- Yes, there were three different variables measured instead of one.
- Yes, because no one recorded who did not help.
- No, any one of these options is a valid way of measuring helping behavior.
- No, the three facets of behavior triangulate into one full spectrum measure of helping.

Rochelle receives an email from her roommate, Yael. Yael's email says "Hey there! I just saw this new personality test online- someone posted it on Facebook. The website says that the personality test has been designed by top-notch psychologists and is guaranteed to be 93% accurate! I just took it and you should take it too!" Rochelle has about an hour before her next class starts, so she decides to go ahead and take the personality test. She completes the entire test of 60 questions and her results tell her that she is classified as ESTJ (extraversion, sensing, thinking, judging). She reads the description and thinks that it fits her pretty well. The next day, she is talking to Yael about the results of the personality test and Yael asked her what her classification was. Rochelle can't remember the 4-letter code so she re-takes the exact same 60-question test and she is now classified as an ENFJ (extraversion, intuition, feeling, judging). Rochelle is surprised because only two of the four features are the same as her results from the day before.

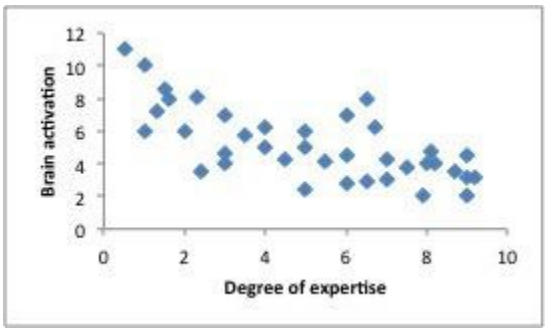
Which of the following is the best reason why this measure is not a valid measure of personality?

- For a test to be valid, a person should be able to take the same test multiple times and get the same result.
- The test is likely affected by Rochelle's mood, which influenced the way she answered the questions.
- The test is not valid because it is only 93% accurate according to psychologists.
- Rochelle rushed through the test the first time; had she taken the time to fully think about the questions she would have received an accurate result the first time.
- Rochelle may have changed her answers on the second iteration because Yael was present.

Imagine that Rochelle took the test three times in a single week and was classified as ESTJ every time she took the test. Does this suggest that the test is a valid way of measuring personality?

- No, the test is more consistent but that doesn't mean the test is actually correctly measuring personality.
- Yes, because the results are now consistent over time.
- Yes, because personality traits are stable personal characteristics.
- No, because Rochelle may have memorized her questions earlier in the week and simply given the same answers again to get the same response.
- No, it's more accurate but the test is still only 93% accurate according to psychologists.

Researchers conducted a correlational study to examine the relationship between degree of expertise in piano playing and amount of brain activation in the prefrontal cortex, an area of the brain associated with self-control. Thirty-nine individuals with varying degrees of experience in piano playing, ranging in age from 18 to 56 were evaluated by independent observers on proficiency in piano playing. All participants were also given an fMRI scan while listening to a familiar piece of music and playing the fingering to the song. The relationship between brain activation and expertise is depicted in the graph below.



Describe the relationship between expertise and brain activation for piano players.

- Greater brain activation is associated with less expertise.
- As piano players become more experienced, their brain activates more and more.
- The older people are, the less their brains are activated.
- Brain activation and degree of expertise do not seem to be related to one another.

A friend emails you a link to an article from Psychology Today with the headline "Men with Attractive Girlfriends Are More Dedicated Boyfriends." The article describes a study that asked whether the attractiveness of a woman could predict the level of dedication exhibited by her boyfriend. The study included 200 male participants who were asked to complete a survey. The level of girlfriend attractiveness was measured by asking each male participant to rate his girlfriend on a set of qualities related to physical attractiveness (e.g. "On a scale of 1 to 7 (with 1 being not at all and 7 being extremely), how attractive is your girlfriend's body?"). The level of boyfriend dedication was measured using self-report items given to the male participants including questions such as "How much effort do you put into maintaining your romantic relationship?" The article reports that there was a strong relationship between the attractiveness of the girlfriend and the dedication level of the boyfriend. The article ends with the following statement: "Clearly, these 'good boyfriends' are more dedicated to their relationship because their girlfriends are smokin' hot!!"

Identify the best alternative explanation to the author's conclusion that is consistent with the study results.

- Men who are more dedicated to their girlfriends tend to find their girlfriends more attractive.
- The author's conclusion is not credible due to use of the term "smokin' hot."
- Attractiveness of the female partner makes men want to be more dedicated to their girlfriends.
- The men in the study are not good boyfriends if they only care about attractiveness.
- Attractiveness is subjective; everyone has a different opinion about what "attractive" is.

Marissa wonders if experiencing positive behavior makes people nicer. She sets up an experiment where the experimental group of participants receives a small free gift in front of the campus union during a busy time of day (e.g., lunch), whereas the control group does not receive the gift. She has research assistants watch the participants to see who opens the door for others. She conducts this study on a Thursday during lunch, and gives gifts to the first 50 people she sees, until she runs out of gifts, and then watches 50 more people for her control group after that.

What is the main factor preventing Marissa from being able to state that receiving a gift causes shifts in acting nicely towards others?

- Marissa should have found a way to assign people to groups more randomly than the order in which they appeared for lunch.
- She does not know their baseline levels of niceness; she should observe people's behavior before giving a gift to see how behavior changes
- Men typically open doors more than women which will likely affect the results
- Marissa should have made sure she had enough gifts for her entire sample.
- People may have been aware of the experimental situation and thus not responded as they normally would have.

Juanita runs an experiment to discover whether or not drinking milk after eating fish will make one sick. Using a sample of 30 people, the results showed that the majority (80%) of participants did get sick within five hours after eating fish and drinking milk. Thus, Juanita concluded that drinking milk right after eating fish will cause sickness.

Do you agree with Juanita's conclusion?

- No, because she did not include a group of people who ate fish without drinking milk first.
- No, because either fish or milk individually might make someone sick.
- No, because not all participants got sick, so we cannot conclude that drinking milk causes sickness.
- Yes, because the amount of people who got sick after drinking milk and getting fish was significantly above chance.
- Yes, provided that allergies or lactose intolerance was not an issue.

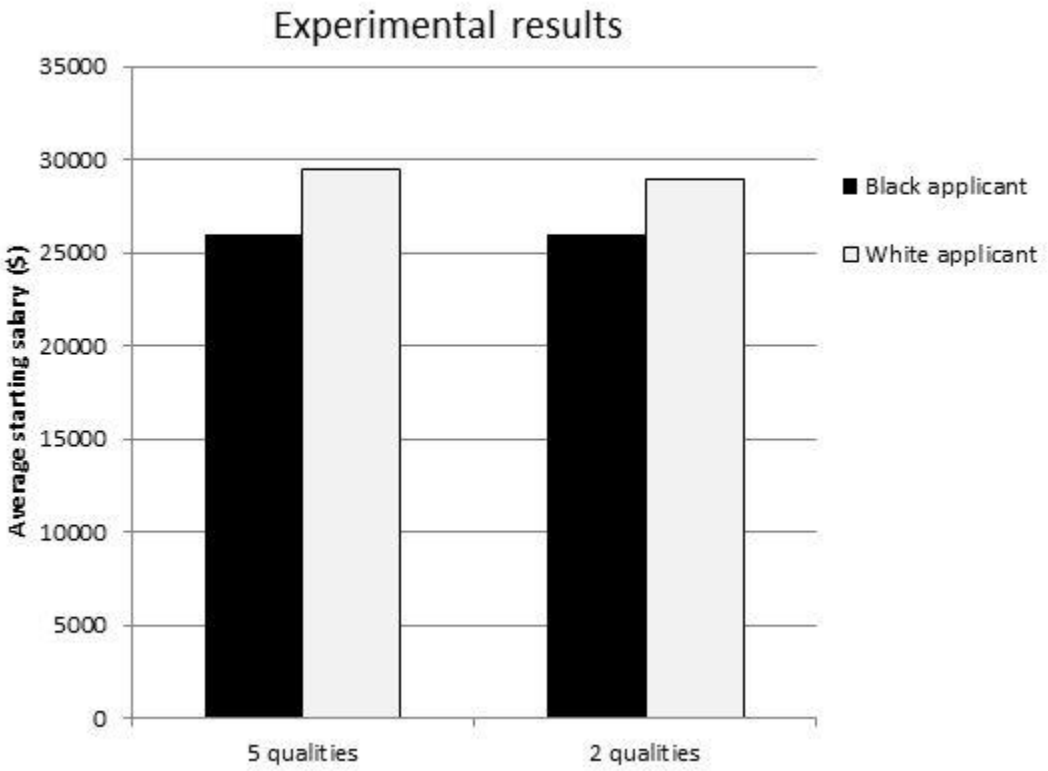
Two researchers are interested in similar research questions: does academic stress cause lack of self-control? Greg recruits a group of 30 college students at the end of a semester during exams, and a second group of 30 college students during the first few weeks of the semester (a less stressful time). He then gives all participants a task to measure attention and finds that the end of semester students have lower attention scores than students at the start of the semester, $t(58) = 3.21$, $p = .02$. At around the same time, Larry recruits a group of 60 students from Professor Parsons' algebra course and (with the agreement of Professor Parsons) gives half of the students a very difficult pop quiz, and the other half an easy quiz. Afterward, all students in the class are measured for self-control using a handgrip strength task. He finds that students in the difficult quiz condition have lower strength than students in the easy quiz condition, $t(58) = 1.99$, $p = .21$.

Which of these studies is methodologically stronger in terms of addressing the researchers' shared question?

- Larry's study, because Larry created two groups who were the same except that they were subjected to different types of quizzes, while Greg created groups who were measured at either the end of a semester or the beginning of a semester but these groups could have differed on a large number of other factors as well.
- Larry's study, because Larry's experimental task was more realistic in terms of the daily life of the students, while Greg's task was much less realistic for students which could skew the data.
- Greg's study, because Greg found that there were statistically significant differences between the scores of his two groups, while Larry did not find that there were statistically significant differences between the scores of his two groups.
- Greg's study, because Greg measured observed students at two different time points during the school year and included students in a wide variety of classes, while Larry only measured students at a single time point during the school year in a single class.

Dr. Vidido and Dr. Rascalia just completed a research study examining the effects of race and job qualifications on how likely someone is to get hired for a job. They surveyed a large number of employers of office jobs in the United States. They asked each employer to read a resume of a job applicant who was applying for a position as a secretary/administrative assistant. The professors were asked to rate the candidate on a variety of qualities including the competence of the applicant, likeability of the applicant, how much they would pay the applicant if they were hired, and so on. The resume that was shown to each participant was identical except that the name on the resume was either a stereotypically "Black" name (Tyrone Marks) or a typically "White" name (Tom Marks). The other variable that the researchers were interested in was the quality of the applicant. One of the applicants had 5 positive qualities, the other only had 2 positive qualities. Below is a graph of the researcher's results for the average amount of money that the applicant would be paid as a starting salary assuming they were hired.

Item24-26P



Look at the bar graph of the data. Ignoring the qualifications of the applicant, does the race of the applicant affect the amount of starting salary that would be offered?

- Yes, the starting salary offered to white applicants was always higher than the starting salary offered to black applicants, whether the candidate was more or less qualified.
- Yes, black applicants were consistently offered a higher starting salary than white applicants, regardless of the number of qualities the applicant had.
- No, the black applicants and white applicants were, on average, offered the same starting quality, regardless of the number of qualities that they had.
- No, because the differences between the starting salaries offered to white applicants and black applicants are not different enough to constitute a statistically significant difference.

Now, ignoring the race of the applicant, do qualifications of the applicant affect the amount of starting salary offered?

- No, on average, applicants with two qualities were offered the same salary as applicants with five qualities, regardless of the race of the applicant.
- No, ignoring race of the applicant, applicants with 2 qualities were offered a lower salary than applicants with 5 qualities.
- Yes, applicants with 5 qualities were on average offered a higher salary than applicants with 2 qualities, regardless of whether the applicant was white or black.
- Yes, white applicants were offered more salary if they had more qualities compared to fewer qualities, whereas black applicants were offered the same amount of salary for 5 qualities and for 2 qualities.

Looking at the graph, does the effect of applicant qualifications on starting salary offer depend on the race of the participant who read their resume?

- No, the difference between the starting salary offered for black and white applicants was the same for both 2 quality applicants and for 5 quality applicants.
- No, there is not enough information to answer this question because the graph does not include data about the race of the person who read the resumes.
- Yes, the black applicants were offered a larger starting salary when they had 5 compared to 2 qualities, but the white applicants were offered a consistently higher salary than black applicants when they had either 2 qualities or 5 qualities.
- Yes, white applicants were offered similarly high starting salaries regardless of their number of qualities, whereas black applicants were offered a higher starting salary when they had 5 qualities compared to 2 qualities.

During a two-part experiment, Ashley has participants complete a self-report survey assessing people's impressions of their impulsivity, and in the second part, participants complete a behavioral task that tests the participants' impulsivity. Why would it be better for Ashley to have her participants complete the task before answering the survey?

- They may be less aware of their actions during the task if they haven't had the survey yet, making the task less biased.
- Participants are likely to lose interest in the study by answering a series of self-report questions.
- If the task comes before the survey, then the survey can ask questions about the task.
- Participants will have a better idea of how to answer questions on the survey after completing the task.

Susan's mother was diagnosed with paranoid schizophrenia at the age of 26. Fortunately, she has received treatment and has been stable and has lived a fulfilling adult life. Susan is enrolled in an

abnormal psychology class at her local community college and one day, she learns that the heritability of schizophrenia is between 70% and 80%. Susan leaves class in a panic and calls her boyfriend in tears. When he asks what she is upset about, she says "I just learned in class that I have at least a 70% chance of being diagnosed with schizophrenia because my mom has it!"

Susan's conclusion is incorrect. Why?

- 70% heritability doesn't mean the same thing as a 70% chance of developing the disorder.
- Although 70-80% of children of schizophrenics inherit the disorder, that doesn't mean Susan specifically has a 70-80% chance.
- She has only a 30-40% chance of developing schizophrenia because she inherits only half her genes from her mother.
- She actually has only a 50% chance because she will not develop the disease if the gene is recessive.

Research investigating the effect of the menstrual cycle on women's moods in 136 women found that during a women's period (e.g., the first 4 days of menstruation) the average mood was 5.6 (SD = 3.5) on a 0 (the worst I've ever felt) to 10 (the best I've ever felt) scale. The average mood during four days mid-cycle (e.g., not during a woman's period) found average mood of 6.1 (SD = 4.2), $t(134) = 1.23$, $p = .23$.

How do you interpret the results of this study?

- The menstrual cycle does not appear to have an effect on women's moods.
- Women feel worse during the menstrual phase than during other times of the month.
- Women feel worse right before their period compared to during the menstrual cycle itself
- It is not possible to make clear conclusions about this study without an r value.

What does the "p" stand for and how is it interpreted?

- The p stands for the probability of obtaining these results if there are no actual differences in mood over a month.
- The p represents the percentage of participants who experienced mood changes across the menstrual cycle.
- The p represents the standard deviation from the mean.
- The p represents the probability the results are due to chance.

Gallup (a polling company based in Washington, D.C.) surveyed Florida residents to investigate their views on new legislation concerning gun restrictions laws for college campuses. A recent bill proposed that college campuses do not have the right to restrict gun rights on their campuses. This bill, if passed, would allow Florida faculty, staff and students with permits to carry concealed weapons on campus. To measure whether Floridians support this decision, Gallup mailed a paper survey to every homeowner in three Florida cities: Tampa, Miami, and Ft. Lauderdale. The results of the poll were based on the surveys

that were mailed back within 30 days; 22% of people who were sent the survey sent it back in. The overwhelming majority of respondents indicated that they did not approve of this bill and they agreed that universities should be allowed to outlaw guns on their campuses. Gallup concluded that the majority of Florida residents did not support the bill that would allow people to carry concealed weapons on college campuses.

Which one of the following is NOT a problem with the above study?

- Paper and pencil surveys are no longer valid methods of obtaining information from a large group of people.
- The people who responded to the survey likely had strong opinions that influenced whether they returned the poll or not.
- Gallup only sent the survey to urban areas and did not get opinions from people living in rural areas.
- Gallup only sent the survey to homeowners, which excludes individuals who do not own their own home (e.g., college students, people who live in apartments).

Dr. Graves conducts a correlational study that examines the relationship between how much a student reads for pleasure and the students' grades in their college-level English classes. After collecting data for 20 participants, Dr. Graves looks at the data and sees that most participants who frequently read for pleasure also performed very well in their English courses. However, she sees that two participants reported that they never read for pleasure but earn high A's in English courses.

Why might these two outliers (the two participants' scores that are far removed from the others in the data) be problematic for Dr. Graves?

- The outliers will skew the data by making the correlation weaker.
- The outliers will skew the data by making the correlation stronger.
- The outliers provide evidence that good grades can be earned without reading for pleasure.
- The outliers suggest that Dr. Graves will need to come up with a new hypothesis.

Dr. Campos is interested in understanding the relationship between students' high school GPA and SAT scores. He surveys the 500 students who have taken the SAT at a local high school, Cheltenham High School. He finds a strong positive correlation between the two variables; students with a higher GPA tend to have a higher SAT scores. When he conducts the same study at the high school of a neighboring town, Abington High School, he decides to save time by only surveying the 60 students who scored 1200 or above on their SAT. Dr. Campos plots the data for the second high school and notices that there is a different relationship between the variables than what he saw before. Dr. Campos concludes that at Cheltenham High School, there is a strong positive correlation between GPA and SAT score, whereas at Abington High School, there is no correlation between GPA and SAT score.

What is the best explanation for why Dr. Campos found a different pattern of result at each school?

- Dr. Campos excluded many students at Abington that he did not exclude at Cheltenham.
- Dr. Campos needs more than 60 people in the Abington sample.
- The academics and teaching materials at Abington are likely different from Cheltenham.
- Dr. Campos did not account for racial or socioeconomic differences between students at each school.
- Certain students, no matter their GPA, do not do well on standardized tests.

Scoring Rubric for APA Style Research Papers

EVALUATING A PSYCHOLOGY RESEARCH REPORT

A rubric and scoring system

Original framework provided by Dr. Jordan Vosmik; revised by G. Gottfried, J. Vosmik, and K. Johnson. Changes and additions based on scoring systems provided by 21 grad student and faculty member volunteers contacted through the Cognitive Development Society electronic mailing list and Developmental Science pilot testers. Support for the development of the rubric was provided by an Instructional Research Award from OTRP.

Notes on rubric use:

- The system is designed for projects that have an APA-style empirical paper (or components of a paper) as an assessment of student learning but can be adjusted for posters as needed. We recommend evaluating the title page and the abstract after reading and evaluating the rest of the paper/poster.
- Content and form are generally scored separately. For example, inclusion of tables is scored with Results; formatting of tables is scored along with APA style. An exception is for scoring the title page.
- Content can be reviewed even in the absence of a formal subsection. For example, a review of the study design does not require a distinct Design subsection in the manuscript; rather, information about the overall design of the study should be apparent from the hypothesis and the Method section. Data reduction may be included in Procedure or in Results. Note that students may include relevant information but in the wrong section (e.g., discuss materials in the procedure section). Score the content as if it were in the proper subsection (i.e., description of the materials), and mark the organizational problem when scoring form (i.e., APA style and/or scientific writing style, as appropriate).
- Not all sections will be required or emphasized for all projects; certain sections can be omitted or weighted to reflect the particulars of the class.
- The Advanced criteria in this system should not be equated with earning an A but rather with the highest standard of the field of psychology. Some classes may have (and may expect) no students producing advanced work in a particular category (e.g., design a study in Introductory Psychology). Note that an absolute standard such as this allows comparisons across developmental levels in a curriculum as well as across institutions.
- It is assumed that students who submit something will earn at least one point, with zero points being reserved for students who do not submit that particular element, if required.

Please address comments and suggestions to Gail Gottfried, gailg@devscilabs.com.

Gottfried, G. M., Johnson, K. E., & Vosmik, J. R. (2009). Assessing Student Learning: A Collection of Evaluation Tools. *Society for the Teaching of Psychology*.

Topic	Advanced (4)	Effective/Developing (3 points)	Less Effective/Introductory (2 points)	Poor (1 pt)
Title page	Title includes variables and some articulation of relations (e.g., "difference between…"; "effects of x on y"). Running head shortened but complete within character limit. All relevant parts of the title page are included. APA style is completely correct.	All relevant parts of the title page are included. Title/RH is appropriate but may not be very concise.	Title/RH does not effectively convey all the variables in the study. Some needed elements may be missing.	Title/RH is not appropriate for a scientific paper. Title page does not follow APA style.
Abstract	Abstract includes research question, variables, number and type of participants, major results, and implications/limitations of those results stated clearly and concisely within the word limit.	Abstract includes all essential information but is misleading due to a lack of concise sentence structure, or there may be some information missing (one paper section).	Abstract is missing essential information from two paper sections or is significantly over the word limit.	Abstract has some incorrect information or does not accurately portray the experiment. Three or more important elements are missing.
Introduction: Topic & Context	Paper (i.e., first paragraph or two) begins in a broad manner and clearly explains the problem to be investigated. Appropriate topic in level and in content (e.g., thesis makes novel contribution to field; cognitive development courses focus on cognitive issues, etc.).	Paper starts somewhat broadly, and provides some theoretical or realworld context for the main concept in the study. An explanation of the key concept or question is provided, but it could be clearer. The topic is appropriate for the class but not necessarily novel in the field.	More clarity in the opening may be needed or the paper may begin with a definition of the topic but provide very little context for the idea (e.g., may begin immediately with review of previous research). The topic, while generally appropriate for the class, may be simplistic.	Paper focuses immediately on the method, or no context for the topic is provided. The topic is not appropriate or is overly simplistic for the class level.

Introduction: Literature review	Studies are described in enough detail so that their relation to other studies and to the relevant theoretical and methodological issues can be understood by the reader. It is clear whether each general statement is a hypothesis, a result of a specific study, or a general conclusion. The review is in the author's own words, and the focus is on the research, rather than the researchers. Limitations of prior research and contrasting views/positions are presented.	Studies are generally described in enough detail so that their relation to other studies and to the relevant theoretical and methodological issues can be understood by the reader (although some sections could be more specific). It is usually clear whether each general statement is a hypothesis, a result of a specific study, or a general conclusion (though some statements may need clarification). The review may include unnecessary quotations or poor paraphrases of the original articles.	Some of the reviewed literature seems to be inappropriate or not well-linked to the topic. Literature may not be reviewed in enough detail for the reader to be sure of its relation to other studies or to the relevant theoretical or methodological issues or it may be one-sided, omitting contrasting viewpoints. The review may discuss key concepts from the literature without paraphrasing adequately (i.e., over-reliance on quotations).	Too few citations are included for the reader to be confident that that literature has been adequately reviewed. Much of the reviewed literature may be inappropriate or not reviewed in enough detail for the reader to be sure of its relation to other studies or to the relevant theoretical or methodological issues. Definition or discussion of key concepts may be improperly paraphrased.

Introduction: Literature Advancement	A brief summary of the literature is provided, and there is a specific, clear description of what is missing from this literature or what researchers do not yet know. A clear explanation of how the proposed study will answer this question or fill this research gap is included. Specific issues, variables, populations, or methods are mentioned.	A brief summary of the literature is provided, but the description of what is missing from this literature or what researchers do not yet know could be stated more clearly. An explanation of how the proposed study will answer this question or fill this research gap is included, but it could be more specific; or, the author makes a vague call for more research without specifying variables, populations, or methods.	A brief summary of the literature is not provided. The description of what is missing from this literature or what researchers do not yet know is unclear. There is little justification why the proposed study will be important to this literature, or the author makes a vague call for more research without any specificity.	A brief summary of the literature is not provided. The description of what is missing from this literature or what researchers do not yet know is absent or very unclear. There is no discussion of why the proposed study will be important to this literature, or no study is proposed at this point.

Introduction: Hypothesis	Hypotheses are all clearly stated, and directional predictions are made based on the previous literature. They are testable. It is clear what the experimental groups will be and what will be measured.	Main hypotheses are stated clearly and directional predictions are made, but it is somewhat unclear what the experimental groups will be or what will be measured. It may be unclear how the hypothesis links to the literature.	Variables in the main hypothesis are stated, but no directional prediction about the relation between the variables is specifically stated. It is unclear what the experimental groups will be and what will be measured. A hypothesis with no justification may be included.	Direction of hypothesis does not follow from the literature presented.
Design	The design of the study is clear and complete and appropriate to test the hypothesis. Variables are appropriate and operationalized properly.	Design is complete and appropriate but not clearly described. Variables are appropriately operationalized but may be simplistic.	Design is not complete or the operationalization of the variables is not clear. Measured variables may be simplistic or lack content validity (i.e., not appropriate).	Design is not appropriate for the hypothesis; variables are not operationalized or not valid.
Method: Participants	Sample is appropriate given hypotheses and large enough for power. Participant information includes number and all necessary characteristics. Exclusions based on behavior (e.g., fussiness, failure to complete) are noted, as are any recruitment criteria or special arrangements (e.g., compensation).	Sample is appropriate given hypotheses, although may be small. A relevant characteristic of the participants may be missing from the description. Must include recruitment criteria or special arrangements.	Sample is not complete given hypotheses (e.g., wrong ages) but is well described. Does not include either recruitment criteria or exclusion information.	Sample is not complete given the hypotheses. Participants are poorly described; replication would not be possible.

Method: Materials	Materials are appropriate given hypotheses and pilot tested and/or checked for reliability. Materials are described with enough detail that a reader could replicate the study; materials should be appended if selfcreated, cited if not.	Materials are appropriate but not complete (e.g., too few questions) or not checked for reliability. The description is adequate but could use more detail. The measures are appended or cited, as needed.	Materials are incomplete and not checked for reliability, or they lack validity given the hypothesis. They may also be adequate but simplistic given the study goals. The description is lacking in details but the measures are appended or cited, as needed.	Materials are incomplete and lacking in validity. They are not fully described or included in an appendix.
Method: Procedure	Procedure is appropriate and ethical. It is described, in order, with enough detail that a reader could replicate the study; instructions and protocol are included. Condition assignments are clear; randomization and counterbalancing are explained as necessary.	Procedure is appropriate and ethical. The description is primarily complete but some minor details may be missing, or some procedural aspects could be explained more clearly.	Procedure is appropriate and ethical. The description is not in order or difficult to follow, or a few major details are absent.	Procedure is not appropriate or not ethical. The description is unclear, or many major details are absent.
Data reduction	Measurement of the dependent variable (i.e., scoring, quantification) is clear, and any procedures for data treatment are explained (e.g., reverse scoring is discussed if necessary; procedures for data cleaning or handling outliers are presented). If necessary, a coding scheme is clear and appropriate and interrater reliability is computed.	Measurement of the dependent variable (i.e., scoring, quantification) is clear and/or the coding scheme is appropriate. Data cleaning and outliers may not be discussed, or the discussion is not clear. Interrater reliability may not have been addressed.	Measurement if the dependent variable is appropriate but not explained clearly and/or the coding scheme is somewhat vague or does not cover all response possibilities (e.g., “maybe” in a Y/N task).	The scoring/quantification of the dependent variable and/or the coding scheme is not appropriate for the design of the study. It may be difficult to understand, even from the Results, how the data were scored/reduced.

Results: Descriptive Statistics	Statistics are appropriate (e.g., means and SD; frequency) and computed accurately. Tables and figures are correct, organized by relevant variables, and called out in text.	Statistics are appropriate and computed accurately. The figures or tables may have minor errors or confusing aspects.	Statistics are appropriate but may be missing some relevant information (e.g., means but no SD). Figures or tables are redundant with text or omitted when necessary.	Statistics are inappropriate (e.g., means computed on categorical data) or computed inaccurately. Figures or tables are omitted when necessary.
Results: Inferential Statistics	Inferential analysis is appropriate for addressing each hypothesis. Each finding is stated in "plain English" and supported with statistics in APA format.	Results section includes correctly used inferential statistics, but they may be incomplete (e.g., lacking appropriate post hoc tests) or the findings are unclear. Results may not be linked to hypotheses.	Results section includes inferential statistics, but they may be incorrect or incomplete. Results do not seem linked with the hypothesis of the study.	Overall the inferential statistics do not address the hypotheses of the study. Results are reported incorrectly, the wrong test is used, or some critical information is missing.

Discussion: Interpretation	Discussion includes a restatement of the findings. Patterns in the data and relations among the variables are explained and conclusions do not go beyond the data. The explanation/ interpretation is well connected to the hypotheses and to the broader psychological problem as represented in the introduction. Any discrepancies between the expected results and the actual data are explained. The take-home message is clearly summarized at the end.	Discussion includes a restatement of the findings, but the analysis of their meaning may be weak or not well connected to the hypothesis. There may be lack of consideration for the broader psychological problem. Only some results are explained (esp. only positive), or the links to previous literature simply restate the introduction.	The restatement of the results is not clear or is misleading. Only some results are explained (esp. only positive), and the links to previous literature simply restate the introduction. The author may inappropriately generalize beyond the data.	Discussion incorrectly states the results or is a rehash of the introduction without clearly presenting the current study. The take-home message of the study is not clear.

Discussion: Evaluation	Author has considered to what extent the results are conclusive and can be generalized. Potential confounds or methodological limits are discussed as appropriate, and future research is suggested.	Potential confounds or methodological limits are discussed as appropriate, and future research is suggested. Author has not considered to what extent the results are conclusive and can be generalized.	Potential confounds or methodological limits are listed but not clearly discussed, and future research is not suggested. Author has not considered to what extent the results are conclusive and can be generalized.	Potential confounds and methodological limits may be listed but may be inaccurate, incomplete, or very unclear.
References	Reference page includes all and only cited articles. The articles are appropriately scholarly and appropriate to the topic. Sufficient recent sources make the review current, and classic studies are included if applicable and available. Original articles/chapters were clearly read by the student.	Reference list may leave out some cited article or include one that was not cited. The articles are appropriately scholarly but may be somewhat tangential and were likely read by the student. Sources include a good mix of recent and classic, as necessary.	Some references may not be appropriate for the assignment. Key references are clearly cited from other sources and not likely read by the student. Sources do not include a good mix of recent and classic, if necessary.	Reference list is more like a bibliography of related sources. References may not be scholarly sources or otherwise not appropriate for the assignment (e.g., too many secondary sources), or they may not be current.

Topic	Advanced (4)	Effective/Developing (3 points)	Less Effective/Introductory (2 points)	Poor (1 pt)

Scientific Writing Style	There is a clear organization to the paper, and transitions are smooth and effective. Tone is appropriately formal. Topic sentences are appropriate for paragraphs, and key ideas are explained/described as needed. Punctuation and grammar are almost completely correct, including proper tenses and voice. Sentences are concise and word choice is precise, with nonbiased language. Proper paraphrases are usually used, but quotation marks are used appropriately if necessary.	Organization is effective although improvements could be made. Transitions are generally there, but are occasionally not smooth, and paragraphs may stray from the central idea. Tone is appropriately formal. Punctuation and grammar are almost completely correct. Sentences are generally concise and word choice is usually precise. Paraphrases are usually used, and quotation marks are used appropriately if necessary.	Organization is less adequate, making the paper difficult to follow. Transitions are sometimes there, and those that are there could be improved. Tone is occasionally colloquial. Punctuation and grammar are usually correct, but there are consistent mistakes. Sentences are not always concise and word choice is sometimes vague. The author includes many quotes or improper "paraphrases" that may constitute unintentional plagiarism.	Organization is confusing. Transitions are missing or are very weak. Tone is consistently too informal. Punctuation and grammar mistakes throughout the paper. Sentences are not concise and word choice is vague. The author strings together quotations without enough original input.
APA Style	Information is included in the appropriately titled sections. Title page, in-text citations, paper format, and Reference page are in APA style with no mistakes. All headers, tables and figures, margins, captions, etc., are in APA style.	For the most part, information is included in the appropriately titled sections. Style is generally correct and must include correct spacing, fonts, and margins. Page breaks must be in appropriate places, and sections must be in order. May have minor mistakes in punctuation of references, in-text citations, statistical copy, or headers.	For the most part, information is included in the appropriately titled sections. Consistent APA style errors in referencing, spacing, or statistical copy.	Four or more consistent style errors, or many inconsistent style errors. Information is consistently included in the wrong sections (e.g., materials described in procedure; discussion included in results).