All areas shaded in gray are to be completed by the department/program. This document will be posted online and must be accessible electronically (including appendices).

MISSION STATEMENT
The primary mission of the Psychology Department at the undergraduate level is to introduce students to the science of the behavior of humans and other animals. We provide both a major and a minor in the discipline and a major and a minor in secondary school teacher preparation. We emphasize student learning of what psychology has to say about human nature, an ability to think critically and complexly about important issues, the ability to communicate ideas successfully, and the participation in the research process and the ability to critically analyze that process. At a practical level, we are aware that students have to exist in the real world once they leave our department, so we also emphasize explicit training in career options in order to help our students take their places as productive citizens of their state and country.

DEPARTMENT OBJECTIVES and ALIGNMENT WITH PRIORITIES FOR ACTION
1. We emphasize student learning of what psychology has to say about human nature. (Place Student Success at the Center of All We Do, Partner with Place).

2. We emphasize an ability to think critically and complexly about important issues. (Drive Excellence and Innovation in Teaching, Learning, and Research).

3. We emphasize the ability to communicate ideas successfully. (Place Student Success at the Center of All We Do).

4. We emphasize participation in the research process and the ability to critically analyze that process. (Drive Excellence and Innovation in Teaching, Learning, and Research).

5. We emphasize explicit training in career options in order to help our students take their places as productive citizens of their state and country. (Place Student Success at the Center of All We Do, Embody the principle of "Mission First, People Always")
## STUDENT LEARNING GOALS and MEASUREMENT TOOLS

<table>
<thead>
<tr>
<th>1. Discipline-specific knowledge</th>
<th>Exit Survey of Seniors</th>
<th>Direct Knowledge Proficiency Exam</th>
<th>Student/Faculty Surveys of Participation in Psychology Activities</th>
<th>Open-Ended Linguistic Scoring of Methods (Critical Thinking Task)</th>
<th>Curriculum Map</th>
</tr>
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<tbody>
<tr>
<td>Disciplined-specific knowledge. We want students to understand the basic aspects of human nature (e.g., social, developmental, biological, learning), to have a basic awareness of the history of our field, and to understand important ethical issues.</td>
<td>X</td>
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| 2. Critical thinking. We want students to be able to think critically and complexly about their world. We want them to be able to work independently and evaluate ideas and research with a logical mind and a critical eye. | | | X | X | X |

<p>| 3. Writing skills. We want students to be able to communicate psychology through the written medium, including gaining the skills to use the primary literature of the fundamental areas of psychology to prepare a clear written summary of a research topic, gaining the ability to create understandable graphical and tabular representations of psychological data and research results, and learning to write in accord with the style manual of | | | X | X | X |</p>
<table>
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<td>the American Psychological Association.</td>
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4. **Data and research methodology.** We want students to learn the skills necessary to design and carry out independent research, the abilities to match basic statistical tests to research hypotheses, to collect and analyze data, to draw appropriate conclusions, to critically read existing research, and to more generally be passionate about and understand the scientific research process. We also want students to actively participate in the research process first-hand.

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5. **Career knowledge and guidance.** We want students to understand their career options with respect to psychology and know relevant information about what persons with a psychology degree can and cannot do with respect to their career.

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</table>

6. **Encourage active participation in the field.** We want students to be active participants in our scientific field and to use this experience to prepare them for careers in psychology; and to understand their career options with respect to

<table>
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<tr>
<td>7. <strong>Awareness of diversity issues.</strong> We want students to understand and appreciate differences between and among different cultural groups, to have knowledge of those groups, and to have an attitude of understanding towards them.</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
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</tbody>
</table>

**RESULTS and MODIFICATIONS**

<table>
<thead>
<tr>
<th>Learning Goal results</th>
<th>Modifications made to enhance learning</th>
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<tbody>
<tr>
<td><em>Discipline-Specific Knowledge.</em> We collected new assessment data in 2020. This data new assessment data yielded support for our Department’s continued success in undergraduate training, in particular in regards to discipline-specific knowledge. (See Appendix C). Analyses of our performance show that, in a comparison of entry-level and exit-level students, our students showed significant gains in knowledge -- across all nine measured focal areas -- throughout their time in the psychology department (overall knowledge $p$’s &lt; .001).</td>
<td>None necessary.</td>
</tr>
</tbody>
</table>

*Critical Thinking.* Faculty discussions revolving around our Curriculum Map suggested that a more direct measurement of critical thinking would be useful. As a result, we developed and implemented an open-ended direct assessment of critical thinking on a methods-related item. As seen in Appendix C, these results once again showed our exit-level students (a) had significantly higher deep processing than our entry-level students, and (b) showed very high descriptive means compared to other normed samples. This provides a compelling, open-ended measurement that complements our exit surveys and performance on the Methods part of Knowledge test – both of which also suggest we are doing well on this domain. | One of the major issues discussed by faculty around our Curriculum Map (see discussion below and Appendix D) has been the importance of critical thinking to our students; and, in particular, the fact that we did not (at that time) have a particularly direct measurement of it. We discussed one possible way of directly measuring students’ critical thinking skills. As a result of this discussion, we developed and implemented this system – initial results were overwhelmingly in support of the success of our program in developing deep critical thinking (see Appendix C). However, more data were necessary, and we collected additional data in 2020. These new results showed our exit-level students (a) showed significantly higher deep... |
Learning Goal results | Modifications made to enhance learning
--- | ---
| processing than our entry-level students as measured by their complexity, and (b) showed very high descriptive means compared to other normed samples. This provides a compelling measurement that complements our exit surveys and performance on the Methods part of Knowledge test – both of which also suggest we are doing well on this domain.

Writing. Writing has historically been an area of weakness in our assessment data. The new 2020 round of assessment data showed a drop-off from the improvement shown during the prior assessment cycle on the subjective self-report of how effective our classes were. However, our newly developed direct open-ended scoring system showed significantly higher linguistic complexity for our exit-level students, which is an objective marker of writing success and has been a stated focal point of faculty. These assessment data from 2020 showed higher scores than the prior round of assessment on writing complexity.

A historical overview: In response to assessment data, the department instituted a second writing course in AY 03-04. (Given our continued large average class sizes, the only reasonable solution was to institute a second upper division writing course to supplement Psyc 320.) Thus, Psyc 400 became our second writing course and the faculty members teaching the course receive a full time assistant to help them with the grading. In addition, a new course which we hope to turn into a writing course, “Multicultural Psychology,” was developed. At the moment, however, we are unable to make it a writing course because we do not have sufficient TA resources to devote to it. Until we get new TA positions, this course will remain as a non-writing course (although it does require a lot of writing). We will continue to seek the TA support from the University needed to make this a full writing course.

Our assessment data reveal an overall trajectory of improvement but this still remains a weakness. This was a focal point of discussions – still ongoing – at the February 2021 faculty meeting where these assessment data were presented.

However, it is worth noting that in spite of these concerns, the complexity of our student writing continues to improve, suggesting an indirect effect of greater attention by all faculty to this issue and the value of the assessment feedback loop.

FUTURE PLANS FOR CONTINUED ASSESSMENT

We have a formal system in place for systematic evaluation of our assessment reports and discussion of possible changes to be made as a result (including a standing Assessment Committee). In other words, we have a feedback loop already in place, with an established history of necessary actions resulting from that feedback.

As a part of our ongoing feedback loop, faculty were presented with Assessment results (see Appendix C) at the February 17, 2021 Full Faculty Meeting. Faculty response was overwhelmingly positive, and the discussion about how to continually improve our overall student trajectory is ongoing.

Indeed, this is a part of a larger discussion that has been in place over the past few years, much of which began with the formulation of our Curriculum Map. This is in line with a long past history of a feedback loop. In the last 15 years, the department (in addition to the aforementioned more recent developments) has developed and successfully implemented a direct method of assessment in our Knowledge Assessment Test. This has been given several times – including during the last round of assessment in Spring 2020 – to both Exit-Level and Entry-Level students. We plan to
continue using this test in the future, as well as potentially developing other tests that might help us better understand our program and students’ learning in that program.

In summary, we have a recent and farther-back history of (1) actively developing and implementing assessment tests, (2) analyzing those tests, (3) producing clear assessment outlines and strategies (e.g., the Curriculum Map), (4) demonstrating that the department is largely effective at meeting its learning goals, (5) providing feedback to faculty about the results of assessment, and (6) directly addressing weaknesses revealed by that assessment. We plan to continue doing all of these things in the future.

APPENDICIES

1. Appendix A: Copy of the Performance-Based Knowledge Assessment Test
2. Appendix B: Copy of the newly-developed Methods Critical Thinking Test
3. Appendix C: Summary of last round of student assessment data (from Spring, 2020)
APPENDIX A: General Psychology Knowledge Assessment Test

Psychology Department, The University of Montana

Please circle the letter of the answer that best answers each question (or, if instructed to do so, fill in your scantron appropriately). Although this will not count towards your grade in this course, we ask that you try your best to answer the questions correctly:

Biopsychology:
1. The tree-like branches of a neuron that receive information from other neurons are called:
   a. axons          c. soma
   b. dendrites      d. myelin

2. The insulating material that covers some axons is called a(n) _______.
   a. axon hillock   c. axonic spine
   b. myelin sheath  d. Owens-Corning fiber

3. The limbic system is believed to be important for which kind of responses?
   a. reflexes.      c. spatial orientation
   b. fine motor control.  d. emotional

4. Where is the primary visual cortex located?
   a. occipital lobe  c. temporal lobe
   b. parietal lobe   d. frontal lobe

5. What is the name given to the specialization of function between the two hemispheres?
   a. hemispherization c. polarization
   b. lateralization   d. somatization

Cognitive:
6. In research on categorization, “typicality effects” are common. For example, people are usually faster at identifying “robin” as a bird, than “ostrich” as a bird. When evaluating typicality effects it should be taken into account that
   a. "typical" exemplars are always objectively superior.
   b. all humans are born with the idea that some exemplars are better than others.
   c. “typical” exemplars will be different in different cultures.
   d. these effects have been repeatedly refuted by modern research.

7. Processes that are directed by expectations derived from knowledge are called
   a. bottom-up processes. c. contextual processes.
   b. top-down processes.  d. controlled processes.

8. Interference from material encountered before learning is called ____.
   a. proactive interference. c. release from proactive interference.
   b. retroactive interference. d. pre-categorical interference.

9. Information that has general meaning (e.g., knowledge of state capitals) but is not specific to any particular event is called
   a. episodic memory information. c. procedural memory information.
   b. semantic memory information. d. memory information in the long term.

10. In a classic problem known as the Luchins "Water Jars" problem, people tend to keep using the same formula to solve each consecutive case even when simpler, easier-to-use formulas are available. This phenomenon is referred to as
a. functional fixedness. 

b. working backward. 

c. hillclimbing. 

d. mental set. 

Abnormal:

11. Which of the following is true about the development of the Diagnostic and Statistical Manual of Mental Disorders (DSM), from its original publication in 1952 to the most recent version?

a. It has become a shorter manual, with the list of possible diagnoses much smaller and more precise than it was in 1952
b. It has become less theoretically-specific, moving away from earlier psychoanalytic origins

c. It is used less frequently now for insurance and reimbursement purposes than it was in the past

d. It is now published by pharmaceutical companies, where the original version was published by the American Psychiatric Association

12. Research that is focused on the causes and symptoms of different diagnoses in the DSM is called...

a. Diagnostic configuration research

b. Correlational research

c. Basic psychopathology research

d. Treatment outcome research

13. Which of the following is true about personality disorders in DSM-5?

a. They cannot be diagnosed until the person is 18 or older

b. They are the most common diagnoses in the general population

c. They must be diagnosed alongside a mood or an anxiety disorder

d. They are the most widely researched diagnoses in the DSM

14. George meets criteria for both Major Depressive Disorder and Generalized Anxiety Disorder. This is an example of

a. misdiagnosis

b. negative symptoms

c. assessment

d. co-occurring disorders

15. Which of the following are NOT possible symptoms of schizophrenia?

a. Delusions, or having fixed false beliefs

b. Cognitive disorganization, or confused thoughts

c. Hallucinations, or experiencing a stimulus that is not actually present

d. Flashbacks, or experiencing an event as if it is happening again

Developmental:

16. Language development is characterized by:

a. a solely maturational (innate) unfolding over time.

b. discrimination of all speech sounds in all languages (until 6 months) followed by specialization in native language(s).

c. rote memorization of words and grammar produced by adults.

d. production preceding comprehension.

17. “Theory of mind” reflects an understanding that:

a. other people think, imagine, pretend, have feelings, and wonder about the world around them.

b. memory is specific only to certain areas of the brain.

c. the mind, not actual experiences, creates memory.

d. the mind is the source of all behavior.
18. Piaget’s theory of development focused primarily on:
   a. how our thinking changes as we grow older.
   b. biological and physical changes over time.
   c. our unconscious issues and problems.
   d. the ways in which our environment influences our daily lives.

19. Environmental agents that cause damage during the prenatal period are called
   a. teratogens.
   b. birth defects.
   c. biohazards.
   d. amniocentesis

20. Which of the following statements is true, according to attachment theory?
   a. Descriptions of children as “difficult” or “slow-to-warm-up” refer to their attachment styles.
   b. Parent-child attachment patterns are only relevant in the early years of life.
   c. Infants throughout the world become attached only to their mothers, regardless of cultural variations in caregiving practices.
   d. The security of an infant’s attachment to the primary caregiver has important implications for later behavior and social relationships.

History and systems:

21. The early roots of modern psychology emerged primarily from the disciplines of western:
   a. education & medicine
   b. theology & religion
   c. history & philosophy
   d. philosophy & physiology

22. According to Watson, the goal of psychology should be to:
   a. Discover the locations and functions of mental processes in the brain.
   b. Predict and control behavior.
   c. Explain how motivation and emotions influence behavior.
   d. Study the unconscious workings of the mind.

23. Why was the U.S Supreme Court’s “Brown vs. Board of Education” decision in 1954 an important event for psychology?
   a. This was the decision establishing the American Psychological Association as the accrediting board for the profession.
   b. This decision, mandating the right to equal education for children of all races, was influenced by evidence from psychological studies of the negative effects of segregation on African-American children.
   c. Brown vs. Board of Education marked the beginning of the field of School Psychology in the U.S.
   d. This led to the requirement that psychologists should be represented in all School Boards throughout the country.

24. Which one of the following people developed the idea of “client-centered therapy” and became a pioneer in the Humanistic Psychology movement?
   a. Sigmund Freud
   b. Carl Rogers
   c. John Dewey
   d. Lightner Witmer

25. The sudden interest in tests & measurements in the early 1900’s was influenced largely by:
   a. a focus on special education
   b. World War I and the need to assess military recruits.
   c. an increase in women entering the field of psychology.
   d. the rising opposition to behaviorism.

Personality:

26. According to Jung’s analytic psychology, the collective unconscious results from:
   a. a person’s experiences since birth
   b. the interactions among the ego, the id and the superego
   c. parental indifference and the development of hostility
   d. the synchronicity between defense mechanisms and anxiety
27. Skinner’s radical behaviorism and Freud’s psychoanalytic approach share an emphasis on:
   a. internal drives
   b. determinism
   c. environmental causes of behavior
   d. early childhood development

28. Albert Bandura’s Bobo Doll experiments were a remarkable demonstration of:
   a. children’s abilities to behave conscientiously and ignore inappropriate adult aggression.
   b. the application of negative reinforcement to the acquisition of prosocial (i.e., helping) behavior.
   c. the application of negative punishment to decrease the frequency of aggressive behavior.
   d. the fact that we can learn novel behavior vicariously, or without direct experiences of reinforcement.

29. The fact that there are individual differences in _______________ is a cognitive explanation for the fact that people demonstrate wide variety in their responses to specific stressors.
   a. appraisal
   b. access to the unconscious
   c. aggression
   d. extroversion

30. A group of persons who speak a common language and share customs and values can be said to share a common _______________.
   a. ethnicity
   b. race
   c. genetic heritage
   d. idiolect

Social:

31. Miller (1984) looked at the attributional tendencies of adults and children in White American and persons from India. Her results suggested that:
   a. the correspondence bias is not learned culturally
   b. among young children, White Americans made more dispositional attributions than people from India
   c. among adults, White Americans made more dispositional attributions than people from India
   d. among adults, People from India made more dispositional attributions than White Americans

32. Any tendency to gather or interpret information concerning the self in a way that leads to overly positive evaluations is called:
   a. self-enhancing bias
   b. correspondence bias
   c. self-perception theory
   d. self-handicapping

33. Steele and Aronson’s (1995) famous study on stereotype threat demonstrated that:
   a. Thinking that a test was highly related to academic ability caused poorer performance among White Americans
   b. Thinking that a test was highly related to academic ability caused better performance among White Americans
   c. Thinking that a test was highly related to academic ability caused poorer performance among Black Americans
   d. Thinking that a test was highly related to academic ability caused better performance among Black Americans

34. Bushman (2002) had one group of participants hit a punching bag while thinking about a person who had angered them (punching bag/rumination), another group hit a punching bag while thinking about becoming physically fit (punching bag/distraction), and a third group do nothing at all (control). Then, he gave all participants the opportunity to behave aggressively toward the person who had made them angry. Which of the following best represents the pattern of results?
   a. participants in all three conditions showed very little aggression
   b. participants in the punching bag/rumination group showed the least amount of aggression (compared to the other two groups)
   c. participants in the punching bag/distraction group showed the least amount of aggression (compared to the other two groups)
   d. participants in the control group showed the least amount of aggression (compared to the other two groups)
35. “People *can* sometimes engage in behavior solely intended to help someone else (without the prospect of personal rewards for the helper), but they don’t do it all the time.” This statement would most likely be uttered by someone who held which of the following ideas about helping?
   a. cynicism theory
   b. social complexity perspective
   c. mood management view
   d. empathy-altruism hypothesis

Methods:
36. In within-subjects experiments, each subject’s performance is compared with its performance during a
   a. experimental period
   b. random sampling period
   c. baseline period
   d. benchmark session

37. Experiments done in natural settings are called ________
   a. natural experiments
   b. spontaneous experiments
   c. unplanned experiments
   d. field experiments

38. Any variable an experimenter manipulates is a/an ________ variable
   a. autonomous
   b. dependent
   c. independent
   d. synchronous

39. Any variable that is allowed to vary freely is a/an ________ variable
   a. autonomous
   b. dependent
   c. independent
   d. synchronous

40. In group-design experiments, researchers often use ____________ to reduce differences among participants.
   a. Clones
   b. Statistics
   c. DNA matching
   d. Matched sampling

Learning:
41. Pairing a novel CS with an already-conditioned CS results in the learning of the conditioned response to the novel CS. This illustrates the phenomenon of:
   a. Pseudoconditioning
   b. Higher order conditioning
   c. Sensitization
   d. Sensory preconditioning

42. The law of effect says that __________.
   a. Satisfying consequences are more powerful than annoying consequences
   b. Behavior is a function of its consequences
   c. How an organism perceives events is more important than the events themselves
   d. Effective behavior drives out ineffective behavior

43. The free operant procedure is most associated with ____________.
   a. Skinner
   b. Thorndike
   c. Pavlov
44. The one thing that all reinforcers have in common is that they ____________.
   a. Strengthen behavior  
   b. Are positive  
   c. Feel good  
   d. Provide feedback

45. Whether children imitate an aggressive model depends largely on _________________.
   a. The nature of the aggressive model  
   b. Whether the model’s behavior is reinforced or punished  
   c. Whether the child is encouraged to imitate the model  
   d. The relationship between the child and the model

Methods (part 2)

46. Which of the following is likely to allow the investigator to make the strongest causal statements about the relationships among variables?
   a. surveys  
   b. case studies  
   c. naturalistic observation  
   d. experiments

47. The typical correlation coefficient varies from
   a. 0 to +1.00  
   b. -1.0 to 0  
   c. -1.0 to +1.0  
   d. -10.0 to +10.0

48. Which of the following is an example of a negative correlation?
   a. Height increases as weight decreases.  
   b. Weight decreases as height decreases.  
   c. Height increases as weight increases.  
   d. Weight stays the same as height increases.

49. The standard deviation is a measure of
   a. variability  
   b. central tendency  
   c. correlation  
   d. significance

50. A researcher has developed a test that is intended to predict success in employment. He finds that for African Americans, the test is an excellent predictor of success in employment. However, for Caucasian Americans scores on the test have no relation at all to success in the job. This means that as a measure of potential success on the job the test appears to be
   a. Valid for African Americans but not for Caucasian Americans  
   b. Valid for Caucasian Americans but not for African Americans  
   c. Valid for both groups  
   d. Not valid for anyone
APPENDIX B: Open-Ended Assessment of Critical Thinking

Exit- and Entry-Level Students were asked to complete the following open-ended task:

Imagine that you are reading the “magazine” section of the Sunday paper when you run across a news brief reporting the results of a psychological study. Now imagine that the writer describes the results of a study in which depressed individuals were measured for the amount they exercised over a four week period. The results showed that exercise and depression were weakly positively related, such that more exercise was associated with less depression. Researchers said this meant that exercise helped depressed people feel better.

Please think carefully about the question, and provide as many responses as you can in the space below: Based on what you know about the imaginary study, would you accept the conclusions of the researchers? Why or why not? (WRITE ANSWER IN SPACE BELOW):

After completing the task, as a measurement of critical thinking, methodological analytical ability, and writing competency, the all responses were scored by the validated Automated Integrative Complexity scoring system, which scores open-ended materials for the degree the author considers (a) multiple differentiated dimensions and (b) integrates those dimensions into a larger hierarchical structure (for validation and explanation, see Conway et al., 2020; Conway et al., 2014, and Houck et al., 2014). It is a good proxy for deep processing of information of the kind we are aiming for in our students. As indicated in Appendix C, results demonstrated clearly that our students are learning to process information critically.
Knowledge Test: Pre/Post Psychology Education

We directly measured students’ knowledge gains in specific areas of psychology by giving the same Psychology Knowledge Test to students who had not been through our program (entry-level) with those who had been through it (exit-level). In particular, we sampled students from one psychology 100 class (N = 64) and Psychology Majors from two 300/400-level classes (N = 29) in Spring 2020.

The results were overwhelming and consistent, both descriptively and inferentially, with our prior results in other survey years: On the overall test score, as well as on each specific category of knowledge targeted by the psychology department, our exit level students performed substantially better than entry-level students in a manner highly unlikely due to sampling error. Please see Table below for specific percentages.

In additional analyses, we further partially controlled for general interest in psychology (or prior learning in psychology) by removing all people who were not psychology majors. The results (though inferentially weaker, as expected with a lower number in the sample) exactly parallel those presented below descriptively. Further, we compared our students to a small sample (n = 15) of non-psychology students in the same 300/400-level classes. This revealed that exit-level psychology students performed better than exit-level non-psychology students (overall knowledge test p < .001). All of this additional data is consistent with the notion that our department’s education specifically caused an increase in knowledge among the students.

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Entry Level</th>
<th>Exit Level</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td>TOTAL SCORE</td>
<td>42%</td>
<td>63%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Psychological Methods</td>
<td>51%</td>
<td>72%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Biological Psychology</td>
<td>53%</td>
<td>59%</td>
<td>.105</td>
</tr>
<tr>
<td>Cognitive Psychology</td>
<td>36%</td>
<td>59%</td>
<td>.012</td>
</tr>
<tr>
<td>Abnormal Psychology</td>
<td>41%</td>
<td>58%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Developmental Psychology</td>
<td>41%</td>
<td>70%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>History/Systems</td>
<td>46%</td>
<td>68%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Personality Psychology</td>
<td>25%</td>
<td>52%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Social Psychology</td>
<td>45%</td>
<td>70%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Psychology of Learning</td>
<td>32%</td>
<td>47%</td>
<td>.002</td>
</tr>
<tr>
<td>Culture and Psychology</td>
<td>41%</td>
<td>64%</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Open-Ended Test of Critical Thinking

We scored open-ended responses to a methodological problem for entry- and exit-level students for their complexity of processing using the scientifically-validated Automated Integrative Complexity scoring system. The Automated Integrative Complexity system scores integrative complexity and two sub-components of complex thinking (dialectical complexity and elaborative complexity).

We first validated the test for use on this sample by correlating it with student scores on the Methods portion of the knowledge test. Integrative complexity was significantly correlated ($r = .34$, $p < .001$) with student scores on the Methods test, and this relationship remained significant ($r = .24$, $p = .015$) when controlling for word count. This reveals that non-trivial variance is accounted for by the Automated Integrative Complexity scores and that this is above and beyond superficial markers like word count.

Importantly, as can be seen below, exit-level students performed better than entry-level students by a wide margin, and this difference was statistically significant for all three forms of complexity (all $p$'s $\leq .001$). Importantly, the overall effect for cumulative integrative complexity held when controlling for word count (partial $p < .001$), revealing that our training is not causing students to merely write more words – but rather our training is causing students to write more complex and deeply-thought-out analyses.

It is further noteworthy that the descriptive means for our exit-level students are extremely high compared to other normed samples. Our exit-level student mean for Integrative Complexity was 2.79 – that mean is above the mean of a sample of the 13 most famous philosophical works of all time (e.g., Plato, Kant, Mill) scored using the same system (mean = 2.60; see Conway et al., 2020) and appreciably higher than a large sample of U.S. presidential speeches (means typically in the 1.7-2.1 range; see Conway et al., 2020). In other words, these results clearly represent the fact that our students are achieving a high level of processing by the end of their time with us.

Critical Thinking Scores for Deep Processing: Complexity of Entry-Level and Exit-Level Students
**Self-Report Survey of Exit-Level Students**

In addition to this direct measurement of student knowledge, we also surveyed exit-level students’ own impressions of their education in our department \( N = 29 \). These self-report surveys confirmed the results from the knowledge test, and were further consistent with similar surveys from prior assessment years.

In particular, students reported that they were very satisfied with their education in the psychology department: On a 0-2 scale (where 0 = “not at all,” 1 = “somewhat,” and 2 = “very much”), 83% of our students said they were “very much” satisfied with their education (and not a single student said they were “not at all” satisfied). A one-sample t-test (with the scale midpoint as the test value) confirmed that this was a positively skewed distribution \( p < .001 \).

We further assessed the degree to which students perceived that the psychology departments’ classes had further developed specific skills in particular areas that are consonant with our departmental goals. (See Figure below for details). We used one-sample t-tests (with the scale midpoint as the test value) to determine which categories were significantly skewed in a positive or negative direction. In particular, students reported that their UM psychology training was especially helpful in developing their content knowledge (objective 1), critical thinking skills, methods skills, and their ability to work on their own (both relevant to objective 2), in helping them develop their reading and listening skills (relevant to objective 4), in helping them understand diversity and cultural issues (relevant to Objective 4), and also in aiding them in making career choices (relevant to objective 5), all \( p’s < .01 \).

Objective 5 is particularly noteworthy given that this used to be a weakness in the department which we have tried to rectify -- in particular, our recent efforts to improve the dissemination of information about career options in psychology early and often in students’ progress here. This suggests that the changes instituted by the department are having a positive impact on students towards meeting objective 5. On the flip side, students reported that their education in psychology did not contribute as much to the development of their speaking, writing, computer, and working in groups skills of students \( p’s > .05 \). To the degree that the department considers changes in what we do in our undergraduate program, we will consider especially these areas of weakness. Though instruction relevant to speaking and computer skills are not primary departmental objectives, and thus it is not entirely surprising that students report a lack of training and development on these skills, they represent relative weaknesses in the training (bearing in mind the they still represent acceptable scores).

"To what extent did your psychology courses help you in developing the following skills?" (0=not at all, 2 = very much)
### Appendix D: Curriculum Map

#### UM Curriculum Mapping Template

**Psychology Degree**

<table>
<thead>
<tr>
<th>Course</th>
<th>Outcome 1: Discipline-Specific Knowledge</th>
<th>Outcome 2: Critical Thinking</th>
<th>Outcome 3: Writing Skills</th>
<th>Outcome 4: Data and Research Methodology</th>
<th>Outcome 5: Career Knowledge and Guidance</th>
<th>Outcome 6: Encourage Active Participation</th>
<th>Outcome 7: Awareness of Diversity Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psyx 100 (Intro)</td>
<td>I, A</td>
<td>I, A</td>
<td>I, A</td>
<td>I, A</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Psyx 105 (Careers)</td>
<td></td>
<td>I</td>
<td>I</td>
<td></td>
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<td>I</td>
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</tr>
<tr>
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<td>D</td>
<td>I</td>
<td>D</td>
<td>I</td>
<td>I</td>
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</tr>
<tr>
<td>Psyx 222 (Stats)</td>
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<td>D</td>
<td>D</td>
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<td></td>
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<tr>
<td>Psyx 230 (Developmental)</td>
<td>M</td>
<td>D</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
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<tr>
<td>Psyx 233 (Aging)</td>
<td>M</td>
<td>D</td>
<td>D</td>
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<td>Psyx 250N (BioPsych)</td>
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<tr>
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<tr>
<td>Psyx 280 (Cognition)</td>
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<td>Psyx 290 (Research)</td>
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<tr>
<td>Psyx 298 (Service Learning)</td>
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<td>Psyx 320 (Methods II)</td>
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<td>Psyx 340 (Abnormal)</td>
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<td>Psyx 345 (Child/Ad. Dist)</td>
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<tr>
<td>Psyx 348 (Family Violence)</td>
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<tr>
<td>Psyx 352 (Comparative)</td>
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<tr>
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<tr>
<td>Psyx 360 (Social)</td>
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<tr>
<td>Psyx 362 (Multicultural)</td>
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<tr>
<td>Psyx 377 (Proctoring)</td>
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<tr>
<td>Psyx 378 (Intro Clinical)</td>
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<td>D</td>
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<tr>
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<td>D</td>
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<tr>
<td>Psyx 390 (Research)</td>
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<tr>
<td>Psyx 398 (Service Learning)</td>
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<tr>
<td>Psyx 441 (Addiction Studies)</td>
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</tr>
<tr>
<td>Psyx 442 (Counseling Theor)</td>
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<tr>
<td>Psyx 499 (Thesis)</td>
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<td>M</td>
<td>M</td>
<td></td>
<td></td>
<td>M</td>
<td></td>
</tr>
</tbody>
</table>

**KEY:**
- **I** = Introduced
- **D** = Developed/reinforced, with opportunities to practice
- **M** = Mastery
- **A** = Assessment evidence collected
- **Italics** = Required Course