1. Student Learning Goals

The Department of Psychology Faculty engaged in an extended series of discussions to identify what we believed should be the key learning goals for students majoring in Psychology. The discussions began by brainstorming about possible goals and then moved to organizing the goals generated into larger groupings and elaborating the specific learning objectives for each grouping. We found this process to be quite useful. Not surprisingly, we had some discussion about the relative importance of goals related to learning content (e.g., learning about key studies or areas of the brain) and goals related to specific skills (e.g., being able to marshal evidence for an argument). There was some disagreement among department members about how much content was critical to learn. In the end we resolved this by deciding that some core content was necessary in order to develop an adequate conceptual mapping of the field.

These discussions served multiple purposes. They helped identify assessment targets for this Teagle project and they helped guide an extended curricular revision process that the Department has engaged in over the last several years. By identifying core goals, we were able to move through significant and challenging curricular decisions by considering how potential revisions might facilitate these goals. These goals have also been helpful in identifying areas of the curriculum that we need to continue to support and strengthen as we begin an important phase in which we will be replacing a number of senior faculty that are transitioning to retirement.

This initial process resulted in the identification of the following five major student learning goals:

1. Students should develop a conceptual map of the field
2. Student should enhance their ability critically evaluate theory and evidence as it is presented in the literature
3. Students should learn to marshal evidence and an argument in both written and oral form
4. Students should engage in progressively more complex activities involving the collection, analysis, and interpretation of data
5. Students should practice relating psychological theory and research to individual, group, organizational and public problems.

2. Learning Objectives that flow From Goals
After extensive deliberation, the Department chose to focus selectively, for the Teagle Assessment Project, on the goals related to research design, statistical analysis and interpretation of data. As a department, we hope that students will develop quantitative and statistical reasoning skills and knowledge of the foundational principles of scientific methods so that they can critically evaluate research and apply research methods in psychology to investigate relevant questions.

We articulated the following learning objectives that flow from this broad learning goal:

A. Understand the use of correlational and experimental evidence and the scientific method, including the conditions required for causal interpretation.
B. Learn how to design research (e.g., choose a sample, develop procedures, choose measures) in ways appropriate to the questions being asked.
C. Learn how to apply basic principles of exploratory data analysis, to develop the ability to know what statistical analyses are relevant to the questions at hand, and to read and interpret tables and figures.
D. Learn to read and interpret tables and figures (e.g., seeing patterns that exist in the data).
F. Apply a general understanding of the logic of statistical inference, of major statistical techniques, of the concepts involved in interpreting the outcome of statistical analysis, and of the limitations of statistical analysis to evaluate evidence.

3. Strategies used to Achieve Learning Objectives

A productive part of our discussion was mapping how our existing major requirements and courses map on to the set of learning objectives we identified. We went through the exercise of listing each learning objective (for all of our learning goals) and indicating the extent to which each course in our curriculum provided opportunities to facilitate learning on that objective. Here, we indicate the primary courses in which the methodological and statistical objectives identified above are the prime target.

Our introductory course in Psychology is the first venue in which these goals and objectives are addressed. This course, which has been taught with a required weekly lab, introduces students to the scientific study of human behavior. Laboratory experiences focus on exposure to a range of methods and research approaches. These experiences also provide students with opportunities to work with data and implement basic statistical analyses.

All psychology majors are also required to take Experimental Methods and Statistics (Psych 205). The goal of this course is to provide students with an introduction to general research methodology, experimental design, and the analysis and interpretation of data. The course offers students hands-on experience with all aspects of empirical research, including designing, conducting, analyzing, interpreting, and reporting their own research, as well as with evaluating and critiquing other's research. Topics emphasized in this course include (a) the logic of hypothesis testing and its role in the research process, (b) research ethics, (c) basic principles underlying statistical inference, (d) descriptive and inferential statistics, (e) a core set of parametric and nonparametric inferential statistical methods (e.g., t-tests, ANOVA, correlation, regression, Chi-Square), (f) application of SPSS to carry out statistical tests; (g) accurate
interpretation and reporting of statistical results, (h) the proper way of writing up research in psychology, and (j) the range of research approaches used in psychology. The course includes a weekly lab recitation during which students design and carry out a research project and learn to use SPSS to implement the statistical tests reviewed in the course. Students are encouraged to complete this course by the end of their sophomore year or first semester of junior year.

Critical reading and interpretation of research studies is emphasized in most intermediate and advanced classes in the major. In the past, majors were also required to take a laboratory course at the intermediate or advanced level to facilitate further development of their research and statistical skills.

Students continue to work on these skills in their senior capstone experience. Students satisfy this capstone requirement by either completing an independent research project under the close supervision of a faculty member or by participating in a senior seminar in which the main focus is the evaluation of research relevant to important social issues. A primary goal of the senior seminar is to help students improve their skills as consumers of research information.

4. Assessment Strategy

Building on the previous efforts of the Haverford Psychology Department, we designed an assessment instrument to measure key methodological and statistical skills and knowledge. Questions for the assessment were adapted from several sources. We began with an instrument that Haverford had already successfully piloted for a similar purpose. The questions for the Haverford assessment were taken from the Psychology GRE Subject test (used with permission from ETS) and from exams used in their statistics and methods course. We supplemented these questions with adaptations of additional items that were taken from textbooks designed to teach research methodology. We also added some additional items that we created for this purpose. The resulting assessment includes 27 multiple choice items.

The assessment was piloted in the Spring of 2014 with a group of juniors and seniors in the major. Students were asked for feedback on the clarity of the questions, the content of the questions, and their overall preparedness for such an assessment. Several notable trends were evident in their responses. Most students found the items clear and thought the content and length of the assessment was appropriate. Most students completed the assessment in 30 minutes and all completed it in 45 minutes. They found the questions challenging but not impossible and noted how important the content was. A number noted concerns about forgetting some content from their Methods and Stats training. One striking theme was a clearly stated desire on the part of most students to improve their mastery on the kind of questions being addressed in the assessment. A number of students indicated a desire to focus on these questions in a more sustained way outside of Introductory Psychology and our Methods and Stats class. There were also a small minority of students that raised concerns about the exclusive focus on quantitative skills rather than other content in psychology.

Based on the success of this piloting we have begun formal implementation of our assessment plan this Fall. The plan includes “pre-testing” students as they begin the major and post-testing students in the Spring of the Senior year. The same assessment is used at both points, and we
utilize student ids to enable us to link assessments across both points. To facilitate
implementation, we have created an online portal for the assessment that automatically scores
assessments and creates a database that we can use for analyses. Students eligible for the pre-test
are sent an email with a link to the survey. During the first few weeks of the Experimental
Methods and Statistics Class, all students are asked to complete the assessment. At the time that
students initially sign up to major in Psychology, if they have not already taken the assessment as
part of the Methods and Stats Class they are asked to complete the pre-Assessment. The first
pre-Assessment data from students declaring their majors will be collected in November.

We do have data from 51 students who completed the assessment this fall as part of their
enrollment in the Stats and Methods class. Overall, students answered 51% of the questions
correctly (with a range of 11% to 81%) on the assessment, which is in the range we might expect
for students who have completed introductory psychology and likely a few other courses but
have not yet received the intensive training received in the Stats and Methods class.

5. Discussion of Assessment Project and Changes In Curricular Practices

The pilot data and feedback from that piloting were presented and discussed at department
meetings. These discussions and other discussions focused on our assessment efforts have
prompted reflection about the best way to strengthen the skills contained in the learning
objectives that are central to this assessment. One important outcome of these discussions has
been a recognition that these skills cannot be taught just in isolated courses; they must be
reinforced throughout the curriculum. A key data point that we used was the feedback form
students during piloting that they wish these concepts were reinforced in classes outside of Stats
and Methods. Our informal observations of students working on theses and participating in
Senior Seminar suggest that retention is indeed a challenge if students do not have repeated
chances to encounter and work on these skills. This view is also consistent with the conclusion
our BICO counterpart reached in their final report for their Teagle Assessment project.

After extensive discussions, we have made a number of changes in our curriculum that we think
will facilitate greater learning and retention of these learning objectives. We outline these
changes below.

We have reallocated some teaching resources from the introductory level that were committed to
laboratory experiences and added additional ones to substantially increase laboratory experiences
at the intermediate level in our curriculum. Introductory Psychology has also augmented its
focus on basic methodological and statistical knowledge. For example, rather than traditional
laboratory meetings, several projects have been added to Intro Psych that require carrying out
basic analyses and the display and description of data. These topics have also been incorporated
more fully into class time in this class.

At the 200 hundred level, are inaugurating (this year) half-unit laboratory experiences that are
focused on data collection, research design and statistical analysis in the area of specialization of
the faculty member teaching the class. These laboratory classes are capped at 15 so that students
can have carefully supervised, hands-on experience learning and applying these important skills.
Students signing up to major in this academic year and in subsequent years will be required to
take two of these laboratory classes to gain breadth in experience and to gain repeated exposure to overlapping scientific constructs and methods across areas.

We have also begun to discuss the idea of identifying assignments that could be adapted for use across a number of courses that might reinforce the skills we are hoping students will learn. For example, this year we are piloting the use of the Figure-Facts Exercise (Round & Campbell, 2013), which is designed to help students better navigate primary source research articles by focusing them on the data contained in figures and tables. The Figure-Facts exercise using an electronic template to provide a structured approach to reading research articles and identifying and decoding key data presented in the studies described. One faculty member successfully used this technique (see Appendix I) in a large 200-level class this fall.
Appendix I: Example of Figure Facts Assignment (adapted from Round & Campbell, 2013)

Psych 209 Figure Facts Exercise

The Figure (Table) Facts approach (Round & Campbell, 2013) is intended to achieve two goals:

1. provide some structure for reading of research articles so you experience less frustration and confusion &
2. help encourage you to shift your focus away from primarily the text in research articles to the data presented in tables and figures.

Here is an example of a completed Figure Facts Exercise for one Figure:

<table>
<thead>
<tr>
<th>Your Name: Sue Smith</th>
<th>Author/Year: Shedler, Mayman, &amp; Manis, 1993</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad Topic:</td>
<td>What is the best way to assess psychopathology/distress?</td>
</tr>
<tr>
<td>Specific Topic:</td>
<td>Validity of self-reported mental health and clinical judgment</td>
</tr>
<tr>
<td>What is Known:</td>
<td>Mental Health scales widely used &amp; thought to be valid</td>
</tr>
<tr>
<td>Primary Study Questions:</td>
<td>(1) Do defensive processes interfere with validity of self-reported symptoms? (2) Is clinical judgment useful in overcoming distortions linked to defenses? (3) Is there a physiological cost to defenses?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel (if multiple parts to figure)</th>
<th>Method/technique:</th>
<th>These data show:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2</td>
<td>Physiological Monitoring, Self-Report Questionnaires, Clinical Interview &amp; Judgment, Laboratory-based Tasks</td>
<td>Individuals who report little distress but are judged distressed show greater coronary reactivity than those reporting little distress who were judged as healthy; Coronary reactivity highest during stressors (as compared to rest)</td>
</tr>
</tbody>
</table>

Instructions:

1. Use the ELECTRONIC VERSION of the WORD template included below as you read the assigned article.
2. Fill in your name and identify the article you are summarizing in the first row of the Template.
3. Carefully read the Introduction to the article and fill in key pieces of information that identify the primary rationale(s) for the studies presented in the paper.
   a. You responses should be clear but they can be brief. Full sentences are not required.
   b. “What is known” refers to key previous findings that led to this study; What does this study build on that was previously known?
4. Read the Method Section, and for each figure (or Table), describe the method or technique used to derive data.
   a. Likely terms or phrases you might use here include:
      i. Self-report questionnaire
      ii. Experimental manipulation (with or without random assignment)
      iii. Laboratory-based observations
      iv. Naturalistic observations
      v. Correlational Study (non-experimental)
         1. Longitudinal or Cross-Sectional
      vi. Genetic Assays
      vii. Brain Scanning techniques
      viii. Neuropsychological or Cognitive Assessment

5. **BEFORE READING THE RESULTS**, try to state the main result and conclusion that can be drawn from the data in the figure.
   a. You may find that there is not sufficient information in the figure to interpret it (there should be but that is not always the case); if this is the case, try to draft your response in the Figure Facts chart and then skim the relevant parts of the Results.
   b. Be sure to use your own words when filling in columns about methods and findings rather than paraphrasing the authors’ words. This will help increase your understanding of the material and provide an important check on whether or not the authors have represented their data accurately.

*Electronic WORD Template that you can use for completing this assignment:*

<table>
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<tr>
<th>Your Name</th>
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