

Scholarship of Assessment Grant Report:
*Development and Evaluation of a Learning Outcomes Assessment
for Senior Psychology Majors*

Jeffrey R. Vittengl
Associate Professor of Psychology
Truman State University
January 22, 2008

Background and Rationale

The Psychology Department at Truman State University identifies knowledge, skills, and attitudes outcomes for psychology majors to achieve (see Table 1), consistent with recommendations from the American Psychological Association (Halonen, Appleby, Brewer, et al., 2002). The Psychology Department recently completed a 5-year program review that supported students' gains in target outcomes (Truman State University Psychology Discipline, 2006), but assessment was fragmented. For example, the nationally-normed Major Field Achievement Test (MFAT; Educational Testing Services, 2005), local Liberal Arts and Sciences Portfolio (e.g., ratings of Scientific Reasoning), course grades, and capstone research projects each contributed to evaluation of some target outcomes but none provided a comprehensive assessment. Consequently, the Psychology Department identified creation of a senior survey as a potential solution to this issue in its 2006 Continuous Improvement Plan Update.

The purpose of this project is to evaluate a new assessment instrument written to assess students' reports of their gains in target knowledge, skills, and attitudes and the means by which the students achieved those gains (see Tables 1 and 2). Survey data were collected from all capstone sections at the end of the fall 2006, spring 2007, and summer 2007 semesters. Because the capstone survey assesses all target outcomes simultaneously on the same measurement scale, comparisons among Psychology's relative performance are more direct and potentially more useful. In addition, the capstone survey provides a new source of information--students' views

about their learning. This report evaluates the capstone survey's feasibility (e.g., response rate), reliability (e.g., internal consistency and structure), validity (e.g., prediction of other assessment data), and added value (e.g., improved understanding of students' achievements) in support of improving Psychology students' learning experiences at Truman State University.

Method

Participants

During the fall 2006, spring 2007, and summer 2007 semesters, 109 of 115 students enrolled in PSYC 466 Psychological Research completed the voluntary survey, yielding an overall response rate of 95%. Among these 109 students, 108 provided information (name and student number) allowing matching with other sources of assessment data. The subsets of participants with both capstone survey and other assessment data varied by instrument.

Procedures

Student research assistants followed a standardized protocol and instructions to collect survey data from capstone course sections. Both verbal and written instructions on the survey cover page indicated that participation was voluntary. Student research assistants double-entered survey data into a computer spreadsheet. Data were audited and cleaned before analysis.

Measures

The 35-item face-valid capstone survey taps target knowledge, skills, and attitudes (see sample items in Table 2). For each survey item, participants rate their degree of development and indicate sources of gains. In addition to the capstone survey, the University Registrar provided archival data, including ACT composite (ACT, 1997), MFAT Psychology composite (completed by majors in the year before graduation), Psychology grade point average (GPA), and College Student Engagement (CSEQ) scores (completed by quasi-randomly selected students in Truman State University's junior testing program; Gonyea, Kish, Kuh, Muthiah, & Thomas, 2003).

Results

Reliability of Target Knowledge, Skills, and Attitudes Scales

Students' ratings of gains on capstone survey items were averaged to form scales for each of the target knowledge, skills, and attitudes outcomes (see Table 1). As shown in Table 3, alpha reliability coefficients were acceptable for all 11 scales (median = .81, range .71-.90).

Principal axis exploratory factor analysis of the 11 scales revealed a 1-factor structure. The eigenvalues for the first three factors were 4.32, 0.79, and 0.40, and all scales had moderate loadings on the first factor (median = .64, range .48-.74). One interpretation of this structure is that scores on individual scales represent facets of students' overall success in the psychology major. Stated another way, target knowledge, skills, and attitudes develop synchronously rather than independently.

Magnitude of Gains in Target Knowledge, Skills, and Attitudes

All scale means were in the range of 1.97-2.56 on a scale from 0 (no gain) to 3 (large gain) indicating that students reported moderate to large gains, on average (see Table 3 and Figure 1). A linear mixed model revealed that the means for scales differed significantly, $F(10,1077) = 16.23, p < .01$. Tukey-Kramer follow-up tests identified many pairwise differences among scales (see Table 3). However, most differences among scale means arguably are too small to be of practical importance (see Figure 1). A possible exception is students' lower reported gains in knowledge about implementing learning in occupational pursuits (area D), the only scale with an average numerically below 2.0 (the threshold for "moderate" gains).

Sources of Gains in Target Knowledge, Skills, and Attitudes

On each survey item, students reported if their gains derived from PSYC classes, research experiences, and/or internships. Item responses were averaged to form scores for each of the target knowledge, skills, and attitudes outcomes (see Table 4). Students reported making most of their gains in connection with Psychology courses, the largest (and required) part of the Psychology program. Research and internship experiences appeared supplemental for psychology program as a whole, as well as for those students who participate in these experiences specifically. Of course, these proportions do not quantify the amount of learning

derived from coursework and other experiences, only whether the experience contributed to students' gains. Benefits of research and internship experience not captured by the target learning outcomes (e.g., gaining employment and entrance into graduate school) also were not assessed by the capstone survey.

Predictive Validity of Target Knowledge, Skills, and Attitudes Scales

Multiple regression was used to test the validity of knowledge, skills, and abilities scales in prediction of psychology GPA, MFAT composite, and conceptually-related CSEQ scales (personal development, intellectual development, and vocational preparation). Individual scales significant in the overall equations are highlighted as especially strong predictors (see Table 5).

Prediction of psychology GPA was significant, $F(11,93) = 1.95, p = .04, R^2 = .18$. Among the individual scales, larger gains in skill area C (learning to conduct meaningful psychological research) were an especially strong predictor of higher psychology GPA.

Prediction of psychology MFAT was significant, $F(11,77) = 2.25, p = .02, R^2 = .24$. Larger gains in skill area C (learning to conduct meaningful psychological research) again was an especially strong predictor. In contrast, students who reported larger gains in knowledge area D (learn how to implement knowledge in occupational settings) and skill area D (improve communication skills) had lower MFAT scores. One interpretation of these negative predictors is that students who make larger gains in these areas have lower incoming academic development and so have more to gain in college. Consistent with this interpretation, students with lower ACT composite scores reported greater gains in knowledge area D ($r = -.31, p < .01$) and skill area D ($r = -.25, p < .01$).

CSEQ data were available for less than half the sample, limiting the power of analyses. Prediction of CSEQ personal development, $F(11,31) = 1.11, p = .38, R^2 = .28$, and intellectual development, $F(11,31) = 1.11, p = .39, R^2 = .28$, was not significant. However, prediction of CSEQ vocational preparation was significant, $F(11,31) = 2.25, p = .04, R^2 = .44$. Among the individual scales, larger gains in attitude area A (respect and empathy for others) was an especially strong predictor of vocational preparation.

Incremental Validity of Target Knowledge, Skills, and Attitudes Scales

Hierarchical multiple regression was used to test whether the capstone survey improved understanding (prediction) of students' psychology GPA and MFAT composite scores. (Because the sample size was much smaller, CSEQ scores were not included in incremental validity analyses.) Psychology MFAT and GPA were strongly correlated, $r = .56, p < .01$. Capstone survey scales did not add incrementally to prediction of MFAT from GPA, $F(11,76) = 0.76, p = .68, \Delta R^2 = .10$, or GPA from MFAT, $F(11,76) = 0.48, p = .91, \Delta R^2 = .06$.

Conclusions and Recommendations

The data support several general conclusions outlined below. Especially because many effects were small to moderate in size, replication of these findings will be important before using capstone survey results to revise the Psychology program.

First, implementing a brief survey of Psychology majors during the capstone course proved feasible. Nearly all students completed the survey, and informal reports suggested that most students completed the instrument within 15 minutes. Administering the capstone survey via computer (e.g., Blackboard or the University survey system) instead of paper would reduce the data processing burden for the Psychology Department.

Second, the capstone survey provided reliable information. All scales demonstrated adequate internal consistency and marked facets of the same construct. Moreover, students reported moderately large gains in all areas assessed. Students identified classes as primary sources of gains, with research and internships as important but secondary sources. Differences among specific knowledge, skills, and attitudes areas were small in magnitude, with the possible exception of lower gains in knowledge about occupational applications.

Finally, correlations with psychology GPA and MFAT scores, and to a lesser extent with the CSEQ, supported the validity of the capstone survey. To a moderate extent, students' subjective reports of their gains in target knowledge, skills, and attitudes on the survey predicted achievement on these independent objective measures. This pattern of results suggests that the capstone survey may provide the Psychology Department with a useful source of information.

However, the capstone survey did not increase the correlation between MFAT and GPA scores to better explain individual differences in these measures. In addition, the gain rating format on the capstone survey (e.g., "how did you *learn* about...?") may yield ratings influenced

by pre-college achievement (i.e., higher ACT scores correlated with smaller gains on the survey scales predicting lower MFAT scores). Revising the capstone survey to use an absolute rating format (e.g., “how much do you *know* about...?”) might clarify relations with assessment instruments using absolute metrics (e.g., MFAT). On the other hand, interpretation of gains made as part of the Psychology program could become less clear with an absolute instead of gain rating format. Additional research with alternative rating scales would clarify the costs and benefits of competing measurement strategies on the capstone survey.

References

ACT. (1997). *ACT Assessment technical manual*. Iowa City, IA: Author.

Educational Testing Service (2005). *Major Field Tests*. Retrieved September 18, 2007, from http://www.ets.org/Media/Tests/MFT/pdf/mft_testdesc_psych_4bmf.pdf

Gonyea, R. M., Kish, K. A., Kuh, G. D., Muthiah, R. N., Thomas, A. D. (2003). *College Student Experiences Questionnaire: Norms for the Fourth Edition*. Bloomington, IN: Indiana University Center for Postsecondary Research, Policy, and Planning.

Halonen, J. S., Appleby, D., Brewer, C. L., Buskist, W., Gillem, A. R., Halpern, D., Hill, G. W., Lloyd, M. A., Rudmann, J. L., & Whitlow, V. (2002). *Undergraduate psychology major learning goals and outcomes: A report*. Retrieved September 18, 2007, from <http://www.apa.org/ed/pcue/taskforcereport.pdf>

Truman State University Psychology Discipline. (2006). *Review of the undergraduate psychology program: Fiscal years 2002-2005*. Kirksville, MO: Truman State University.

Table 1

Psychology Majors' Target Learning Outcomes

Knowledge

- a. Show familiarity with the major concepts, theoretical perspectives, empirical findings, and historical trends in psychology.
- b. Understand basic research methods in psychology, including research design, data analysis, and interpretation.
- c. Develop insight into behavior and mental processes.
- d. Emerge from the major with realistic ideas about how to implement their psychological knowledge, skills, and values in occupational pursuits in a variety of settings.
- e. Understand the ethical principles of psychological research and practice, as defined by the American Psychological Association.

Skills

- a. Use critical and creative thinking and the scientific approach to solve problems related to behavior and mental processes.
- b. Apply psychological principles to personal, social, and organizational issues.
- c. Learn to conduct meaningful psychological research, including literature review, research design, data analysis, and interpretation.
- d. Be able to communicate effectively in a variety of formats.

Attitudes

- a. Respect and empathy for others.
 - b. Appreciation of the complexity and dynamic nature of scientific knowledge.
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Table 2

Sample Items from the Learning Outcomes Assessment for Senior Psychology Majors

<i>How much did you learn about...</i>	Learning Rating Scale				Sources of Learning			
	0 = I learned nothing. 1 = I learned a small amount. 2 = I learned a moderate amount. 3 = I learned a great deal.				What contributed to your learning in this area? <i>Check or write in all that apply.</i>			
	<i>(circle response)</i>				PSYC Classes ▼	Research Experiences Outside of Classes ▼	Intern- ship ▼	Other (specify) ▼
major historical trends in psychology?	0	1	2	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
data analysis in psychology?	0	1	2	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
ethical principles of psychological practice?	0	1	2	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
research design in psychology?	0	1	2	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
implementing psychological knowledge in occupational pursuits?	0	1	2	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Note. The Table contains a sample of 5 of 35 total items on the survey written to assess target knowledge, skills, and attitudes.

Table 3

Descriptive Statistics for Survey Scales

Scale	Mean	<i>SD</i>	Number of Items	Alpha Reliability
Knowledge				
Area A	2.56	0.40	4	.71
Area B	2.32	0.52	3	.81
Area C	2.47	0.56	2	.71
Area D	1.97	0.69	3	.81
Area E	2.54	0.55	2	.79
Skills				
Area A	2.22	0.58	6	.88
Area B	2.28	0.63	3	.76
Area C	2.26	0.58	4	.71
Area D	2.12	0.69	3	.82
Attitudes				
Area A	2.02	0.90	2	.90
Area B	2.33	0.70	2	.86

Note. $N = 109$. Differences among scale means $\geq |0.23|$ are significant at Tukey-Kramer adjusted $p < .05$.

Table 4

Frequencies of Reported Sources of Gains in Target Learning Outcomes

Outcome	Psychology Courses	Research (raw)	Research (adjusted)	Internship (raw)	Internship (adjusted)
Knowledge					
Area A	99%	14%	20%	1%	8%
Area B	96%	35%	54%	4%	15%
Area C	99%	6%	14%	4%	21%
Area D	94%	11%	26%	12%	64%
Area E	98%	18%	25%	9%	50%
Skills					
Area A	95%	13%	32%	9%	49%
Area B	94%	9%	21%	8%	28%
Area C	97%	28%	48%	3%	8%
Area D	89%	20%	43%	8%	25%
Attitudes					
Area A	78%	18%	29%	12%	63%
Area B	95%	19%	54%	8%	42%

Note. $N = 106$ for Psychology courses and raw estimates for Research and Internship. Adjusted estimates for Research ($n = 14$) and Internship ($n = 12$) include only those students from Spring and Summer 2007 semesters who reported participating in these activities.

Table 5

Standardized Coefficients from Prediction of Achievement Measures from Senior Survey Scales in Multiple Regression Analyses

Survey Scale	Psychology GPA	MFAT Composite	CSEQ Vocational Preparation
Knowledge			
Area A	.11	-.05	.39
Area B	.07	.10	.13
Area C	-.05	.06	-.17
Area D	-.09	-.27*	.14
Area E	-.14	-.04	-.18
Skills			
Area A	.21	.15	.38
Area B	-.18	-.04	-.03
Area C	.28*	.30*	-.39
Area D	-.10	-.30*	.33
Attitudes			
Area A	-.20	-.13	.40*
Area B	.06	.08	.01

Note. GPA $n = 105$, MFAT $n = 89$, CSEQ $n = 43$.

* $p < .05$, 2-tailed.

Students' Self-Reported Gains in Target Areas

