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The Memorability of Introductory Psychology Revisited

R. Eric Landrum[1] and Regan A. R. Gurung[2]

Abstract

Almost 2 million students enroll in introductory psychology each year in the United States, making it the second most popular undergraduate course in the nation. Introductory psychology not only serves as a prerequisite for other courses in the discipline but for some students this course provides their only exposure to psychological science. Presently, when introductory psychology students are asked about what they believe they will learn in the course, students indicate becoming more insightful about their own behavior and expect to have improved critical thinking skills. However, what do students actually remember from introductory psychology? Two years after completing the course, a sample of students voluntarily retook their cumulative final exam, and we compared these scores to senior-level psychology majors enrolled in a Capstone course. We discuss the outcomes in relation to the knowledge retention expected for subsequent coursework as well as realistic expectations of faculty members about what their students know.

Keywords

introductory psychology, knowledge retention, cumulative final exam

The importance of the introductory psychology course in the United States is undeniable. The introductory psychology course enrolls approximately 1.7 million students annually (Homa et al., **in press**); it is the second most popular college course in the nation, second only to English Composition (Adelman, 2004). Not only are there numerous dedicated resources to assist psychology educators in teaching the course (e.g., Dunn & Chew, 2006; Sternberg, 1997), but textbooks and resources available to support student learning in introductory psychology courses are plentiful (e.g., Office of Teaching Resources in Psychology, http://teachpsych.org/otrp/index.php). For some undergraduates, the introductory psychology course will be their only exposure to academic psychology, and this access to students provides an opportunistic moment to counteract not only stereotypes fostered by the media and pop psychology (Lilienfeld, Lynn, Ruscio, & Beyerstein, 2010) but also provides the chance to educate about healthy behaviors and correct misperceptions about human behavior. The popularity of introductory psychology provides vast potential to educate others about our discipline. This is an opportunity and responsibility educators should not squander. Our two questions of interest include (1) what do students *think* they will remember from introductory psychology and (2) how much content *do* students remember once the introductory psychology course is complete? The answers to both questions can help shape pedagogy and practice.

Minimal published research is available about what students think they will remember from the course or what they actually do remember. The retention research in this area tends to fall into two categories: retention during the semester and retention some time after the completion of the semester. Although there is a rich literature on pedagogical approaches to encourage student retention during the semester (e.g., Richmond, Carney, & Levin, 2011), our focus here concerns retention following introductory course completion. After reviewing the literature, we identified three general waves of research interest, which we categorize as the early years (the 1930s), the personalized system of instruction (PSI) era (mostly 1970s), and more current efforts (since 2000).

Published studies from the early years include Greene (1931), Eurich (1934), and Watson (1939). For example, Greene tested students who had previously completed an introductory psychology course as a means of examining how prerequisite coursework contributes to knowledge students possess in later courses; Greene also examined these trends for zoology and chemistry. Regarding psychology, students completed the course with an average test performance of 60%; Greene tested the same students at the following intervals, with test performance presented parenthetically: 4 months retention (42%), 8 months retention (26%), 16 months retention (25%),

[1] Department of Psychology, Boise State University, Boise, ID, USA
[2] University of Wisconsin-Green Bay, Wisconsin, WI, USA

Corresponding Author:
R. Eric Landrum, Department of Psychology, Boise State University, MS 1715,1910 University Drive, Boise, ID 83725, USA.
Email: elandru@boisestate.edu

and 20 months retention (24%). Interestingly, Greene was also able to include both (a) college students who had never enrolled in psychology and (b) noncollege students as control groups. College students without psychology coursework scored 16% correct, whereas individuals with no previous training scored 7% correct. Greene concluded that the rate of forgetting was similar to an Ebbinghaus curve, with rapid forgetting followed by a slower rate of forgetting over time.

A second wave of research interest in retention from introductory psychology occurred mostly around the 1970s, with much of this interest surrounding PSI. Regarding long-term retention of information from introductory psychology, some researchers demonstrated a beneficial effect (e.g., Cooper & Greiner, 1971; Goldwater & Acker, 1975), whereas others did not (e.g., Ellis & Rickard, 1977). Rickard, Rogers, Ellis, and Beidleman (1988) followed up Ellis and Rickard's (1977) work by including three different teaching approaches to studying the retention of introductory psychology content: traditional classroom instruction, concept-based instruction, and a control group (participants who had never taken a psychology course). Four months after the completion of the semester (for both the traditional classroom instruction and concept-based instruction courses), a 60-item multiple choice test was given to all three groups with significant differences emerging: the traditional instruction group scoring 72% correct, the concept-based instruction group scoring 68%, and the control group scoring 62%. Gustav (1969) tested advanced psychology majors on their retention of material based on a 24-item multiple-choice test constructed to assess student performance on topics commonly addressed in introductory psychology. The interval between the introductory course and the test administration ranging from 1 to 45 semesters. Gustav reported that 43% of participants scored 60% correct or better on the retention test, whereas the remaining 57% scored 59% or less (60% was selected as it was the value for passing). Thus, more than half of the advanced psychology students were unable to pass an introductory psychology test. There are similar concerns about the retention of information over time from other disciplines, such as economics (Allgood, Bosshardt, van der Klaauw, & Watts, 2004).

Researchers conducting more current studies primarily focus on the particular aspects of a psychology course that students remember, with an increasing emphasis on understanding student opinions about this issue. For instance, VanderStoep, Fagerlin, and Feenstra (2000) examined specific details about what is remembered at the conclusion of an introductory psychology course, and reported that events such as a compelling video, a demonstration with a rat, and a psychic demonstration with magic tricks were the most memorable events—"students remembered vivid anecdotes and demonstrations" (p. 92). But often the introductory psychology course serves as a prerequisite for subsequent courses in the psychology curriculum, an approach that Herman (2010) used in his examination of what students remember. When examining the results in an educational psychology course in which the introduction to psychology course served as a prerequisite, the results were not encouraging. For instance, only 2 of the 96 students could correctly report the names and proper order of Piaget's stages of cognitive development; 41% of students incorrectly believed that a correlation of +.94 was a more powerful linear predictor than a correlation of −.97. These results are disheartening with regard to what subsequent instructors might expect from students following the completion of required prerequisites.

Based on the previous retention literature as well as specific studies whose researchers examined prerequisite course sequencing, one possible explanation for low retention and lack of learning could be due to what students might expect to remember from introductory psychology. Perhaps, with a better understanding of what students expect, faculty members could revise their pedagogy to maximize student interest, and perhaps maximize retention of content over time. To our knowledge, few researchers have published concerning what students may extract from the introductory course experience. One exception is the work of McCann and Kadah-Ammeter (2011); when they asked students about the most interesting items learned in introductory psychology, the most commonly mentioned cluster of topics was personality, disorders, and therapy (see also Sleigh, McCann, & Kadah-Ammeter, 2012 for more on creating student interest).

We attempted to advance knowledge concerning student interest about topics in introductory psychology as well as long-term (2-year) retention of that content knowledge. In Study 1, we present quantitative outcomes regarding what students expect from an introductory psychology (asked toward the conclusion of the course). In Studies 2a and 2b, we present (a) data about the retention of introductory psychology students 2 years after course completion and (b) how these data from introductory psychology students (both originally and 2 years later) compare to senior-level psychology majors completing the same multiple-choice knowledge test.

Study 1

In a survey of students enrolled in an introductory psychology course, we asked 10 survey questions with quantitative responses.

Method

Participants

Students enrolled in an introductory psychology course (N = 457) at the first author's institution participated in this study for course credit that partially satisfied a course-based research exposure requirement. The average age was 20.24 (SD = 4.2), ranging from 18 to 48. Of those reporting sex, 55.8% were women and 44.2% were men. When participants were asked about their expected grade in the course, the average grade points expected (on a 4.0 scale) = 2.94 (SD = 0.7). Student self-reported an average grade point average (GPA) was 2.92 (SD = 0.6). When asked if they were thinking about majoring in psychology, 10.9% of respondents indicated *probably will* or *definitely will*.

Table 1. Descriptive Statistics for Quantitative Survey Questions From Study 1.

Item	*M*	*SD*
I will know the major concepts of psychology, including theories, research findings, and historical developments	3.79	0.8
I will know how to apply the research methods of psychology	3.66	0.8
I will have improved my critical thinking skills when examining my own behavior and the behavior of others	4.09	0.8
I will know how to apply the psychological principles I have been studying to real-world personal and social issues	3.88	0.8
I will be better able to evaluate evidence and act in an ethical manner toward others	3.84	0.8
I will be better able to use computers and find information	3.09	1.1
I will be a better communicator	3.52	0.9
I will understand people better, especially regarding cultural differences and diverse viewpoints	3.94	0.8
I will be more insightful about my own behavior, and use some of the concepts studied during the course in my own life	4.12	0.8
I will understand the employment opportunities for those pursuing further education in psychology	3.57	0.9

Note. These items were answered on a scale from 1 = *strongly disagree* to 5 = *strongly agree*.

Materials

We developed 10 survey questions addressing each of the 10 American Psychological Association (APA; 2007) *Undergraduate Guidelines* that respondents answered on a Likert-type agreement scale from 1 (*strongly disagree*) to 5(*strongly agree*). These items, including descriptive statistics, appear in Table 1. The prompt prior to the survey items was "For each of the statements below, please answer to the extent that you disagree or agree with each. Think about your experience in introductory psychology as you answer these statements. Each statement begins with the phrase 'After my introductory psychology course is complete . . . '."

Procedure

Participants self-selected into the study via Experimetrix, a web-based subject pool management program. Participants completed a larger set of survey questions about the outcomes of introductory psychology; we only present items relevant to this research here. Participants completed the survey items via Qualtrics, web-based survey software program within the last month of their introductory psychology course. After enrolling in the study online, respondents completed the survey online within a 50-min period.

Results and Discussion

We present descriptive outcomes of the quantitative data in Table 1. With 3 = *neutral* and 4 = *agree*, only 2 of the 10 items were rated with a mean greater than 4.00. The items with an average rating greater than 4.00 include, "I will have improved my critical thinking skills when examining my own behavior and the behavior of others" (analogous to *APA Undergraduate Guideline #3*), and "I will be more insightful about my own behavior, and use some of the concepts studied during the course in my own life" (analogous to *APA Undergraduate Guideline #9*). Introductory psychology students improving critical thinking skills and becoming more insightful and self-reflective are certainly positive outcomes (if accurate). But it seems a bit striking that the survey question analogous to *APA Undergraduate Guideline #1* was not rated higher (M = 3.79, SD = 0.8): "I will know the major concepts of psychology, including theories, research findings, and historical developments." Given the traditional role of this course as an information delivery mechanism, some could see this result as disappointing. It should be remembered that these data are self-report; it could be that students actually know more than they report, but given both the self-reported class average GPA (M = 2.94) and the self-reported cumulative GPA (M = 2.93) levels, student self-report of the knowledge possessed may not be overreported or underreported.

The results of Study 1 demonstrate that introductory psychology students can offer valuable insights into their own perceptions of the course. However, the memorability that students expect to have after the course and their actual level of memory performance may differ.

Study 2a

Study 2a answered the essential question: What do students remember 2 years after the completion of their introductory psychology course?

Method

Participants

The possible sample frame consisted of students (N = 242) who completed the first author's introductory psychology course (Fall 2009). Of those reporting sex, 57.7% were women and 42.1% were men. There were 194 first years, 33 sophomores, 10 juniors, 2 seniors, and 3 postbaccalaureate students enrolled in the course; 15 students overall (6.2%) indicated that they were psychology majors. Because the course was already complete when we conducted this study, we obtained retrospective institutional review board (IRB) approval to use course-based records as well as additional student demographics from the registrar's office. Of those who participated in the study (n = 23), three (13.0%) reported majoring in psychology, the average number of credits as of Fall 2011 was 60.96 (SD = 18.8; 128 credits needed to graduate), the average age was 23.05 (SD = 6.6), and there were 19 females (82.6%).

Materials

During the original Fall 2009 semester, each student completed a 130-item multiple choice cumulative final exam, with 10 multiple choice items each covering 13 weeks of the introductory course (one textbook chapter per week). During Fall 2009, the first author created a unique multiple-choice exam for each student using the random block function which extracted items from an instructor-created pool of items. For the present study, we reviewed the entire pool of items and selected representative items from Fall 2009 for this study. The items that current participants encountered were from the same pool as Fall 2009, but were not necessarily the same items. For the present study, each participant did not receive a unique multiple-choice exam; all participants completed the newly created exam with representative items.

Procedure

Every student from the original Fall 2009 course ($N = 230$) was contacted via e-mail by the first author and invited to participate in a study that would examine the retention of information 2 years after the completion of their introductory psychology course. We told former students that we would ask them to complete a 130-item multiple-choice test similar to their final exam from their introductory psychology course. We offered two incentives: for those completing the final exam, we gave an iPod Nano (a) to the high score recipient and (b) a recipient drawn randomly from the remaining participants. Twenty-three former students (10%) volunteered to participate in the study and completed the 130-item final exam. We allowed participants up to 2 hr for completion.

Results and Discussion

Prior to examining the retention of introductory psychology material over time, it is essential to examine if the 23 volunteers from Fall 2011 differed from the Fall 2009 sample frame; that is, did "good" students volunteer, potentially leading to volunteer bias? There was not a significant difference between volunteers ($M = 104.83$, $SD = 11.79$) and nonvolunteers ($M = 101.38$, $SD = 14.50$) on Fall 2009 cumulative final exam scores, $t(240) = 1.10$, $p = .272$, $d = 0.14$. Thus, the Fall 2011 volunteer scores are statistically equivalent to the Fall 2009 nonvolunteer scores.

To what extent did Fall 2011 volunteers retain information from their introductory psychology course 2 years later, as evidenced by the number of items correctly answered on the 130-item multiple-choice exam? Using a paired-samples comparison, there was a significant difference between Fall 2009 ($M = 104.83$, $SD = 11.79$) and Fall 2011 ($M = 72.74$, $SD = 13.48$) scores on the representative cumulative final exam items, $t(22) = 10.34$, $p < .001$, $d = 4.41$. Not unexpectedly, students' retention of introductory psychology information dropped significantly, from a percentage correct score of 80.6% during the course (Fall 2009) to 56.0% two years later (Fall 2011). If the introductory psychology course was a prerequisite for a course taken by a student, but the students only completed the subsequent course 2 years later, we suggest that students 2 years later are performing at a less than 60% correct level. This outcome may make some educators skeptical of the intentions of prerequisite course sequencing.

Study 2b

Similar to Gustav (1969), senior-level psychology majors enrolled in a capstone course completed the same 130-item introductory psychology cumulative final exam used in Study 2a; perhaps psychology majors will demonstrate more memorability for content items, given their repeated exposure to psychology content over the course of an entire undergraduate psychology curriculum.

Method

Participants

Students ($N = 73$) enrolled in the first author's senior-level capstone course Spring 2012 volunteered to complete the 130-item multiple-choice exam used in Study 2a. We offered participants course-based extra credit for their participation. Of those reporting sex, there were 74.2% females and 25.8% males; the average age was 27.05 ($SD = 7.9$). After the course was complete, a retrospective IRB application was approved to utilize course-based data for research.

Materials

We used the same multiple-choice exam used in Study 2a.

Procedure

Sixty-seven students (91.2%) volunteered to take the multiple-choice exam to earn extra credit. We administered the exam via Qualtrics (online survey software); students were allowed no longer than 2 hr to complete the multiple-choice exam.

Results and Discussion

How do Capstone students' 130-item multiple choice exam scores compare to introductory psychology students' exam scores 2 years after the course? There was a significant difference between capstone students ($M = 81.54$, $SD = 14.38$) and introductory psychology students 2 years later ($M = 72.74$, $SD = 13.48$) on number of correct exam items, $t(88) = -2.57$, $p = .012$, $d = 0.55$. Although senior-level majors do score significantly better than introductory psychology students 2 years later, introductory psychology students answered the multiple-choice items with 56.0% accuracy (an F grade), whereas the capstone/senior-level psychology majors answered with 62.7% accuracy (a D grade). This pattern of results helps to spotlight the important challenges of measuring retention, notwithstanding the methodological limitations of this study.

In other words, if these data are accurate representations of the content that students remember from their coursework, then this casts serious doubt about what psychology majors know and can remember about human behavior at the conclusion of their undergraduate careers.

Of course, capstone students would have had the introductory course longer ago than most introductory psychology students 2 years later, and the coverage of topics for capstone psychology majors in their course may have been quite different from the coverage of topics in the first author's course. Nevertheless, psychology majors would have had repeated exposure to a number of psychological concepts over the course of their undergraduate careers.

General Discussion

First, students are not very motivated to learn the "the major concepts of psychology, including theories, research findings, and historical developments" (APA, 2007) shown by mean scores in response to this survey item in Study 1. Second, students' retention of material from introductory psychology is low and does not seem to vary considerably between senior-level majors and others. Given the "relevance of psychology to other majors and fields, most jobs, and the world in general, as well as the many contributions an understanding of psychology can have to personal growth and development" (Dunn et al., 2010, p. 59), this is troubling.

What are the causes of this problem and what are potential solutions? Although it is easy to blame students and assume they are not studying enough, both the student and the instructors influence learning (Hattie, 2009). Students may not study in optimal ways and there are many ways that faculty can help students study better (Gurung & McCann, 2012) but that is clearly not the only issue here. Nonetheless, it would be prudent to help students overcome established shortcomings in how they study such as the limited use of metacognitive strategies (Winne & Nisbet, 2010). Focusing on how students study and learn and intervening to help students process material deeper may be a fruitful direction (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010; Gurung, Weidert, & Jeske, 2010).

What about the role of skill development in the introductory psychology course? If the memorability of content is fleeting, then perhaps a better tactic would be to focus more on big picture ideas (such as those identified in Study 1), to focus on skill development, or to modify classroom pedagogy to improve understanding and retention? The challenge with skill development is the dearth of measures available to measure skills adequately (Landrum & McCarthy, 2010, 2013), but there are notable exemplars of ways modifying pedagogy can be successful. In biology, Nelson (1999) showed that by showing students how to process information and go deeper into material, students perform better on exams. In contrast to not being able to cover as much content due to taking extra time to increase guided student–student interactions and hence more opportunities to interact with the material, Nelson found he could cover the same amount of content as before. Mazur (2009) in physics and Jacobs (2000) in chemistry have similarly changed pedagogy in their introductory classes and demonstrated increases in learning. Improved pedagogy and the development of multiple meaningful outcome measure may also translate into better retention as well.

Before we completely give up on what students learn in introductory psychology, we note that the results of this study only reflect student learning and retention at one university. It is possible that other institutions have courses that do foster greater retention or majors more motivated to learn psychology. Perhaps a true control group for Study 2a, a similar aged noncollege sample completing the same 130-item multiple-choice exam would provide a stronger comparison for our sample. These limitations notwithstanding, we urge additional focus on what instructors cover in the introductory psychology course, how it is covered, and relatedly, how much of the material students retain. Our results raise the alarm and urge instructors to design, implement, and assess pedagogical interventions to rectify the situation.

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