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# What Do Students Remember From Introductory Psychology?

Scott W. VanderStoep  
*Hope College*

Angela Fagerlin  
*Kent State University*

Jennifer S. Feenstra  
*Calvin College*

*In 2 studies, students in introductory psychology courses completed a free-recall task designed to measure their memory for the course. In Study 1, the most frequently recalled items were vivid instructional tools, such as dramatic videos and novel in-class demonstrations. The ratings of these responses measured how relevant they were to a course concept. Only 15% of responses were highly relevant to course material. Students' relevance of responses correlated positively with final grade and test-score percentage. Study 2 found that the concepts students remembered most frequently had vivid instructional techniques accompanying them.*

Knowing what students remember from psychology courses provides descriptive information to teachers of psychology about what topics and what teaching techniques students remember well. Despite intuitive interest in what students remember, little research has been done. Rickard, Rogers, Ellis, and Beidleman (1988) found statistically significant differences between two groups of students who took an introductory psychology course and a control group that did not. The difference—measured by a multiple-choice test 4 months after the instructed students finished the course—seemed relatively small, with the concept-taught group scoring 72%, the traditionally taught group scoring 68%, and the control group (which received no psychology instruction) scoring 62%. Goldwater and Acker (1975) found that students in a standard lecture course scored only 55% correct on a final examination with objective questions. Similarly, Ellis and Rickard (1977) found students in two sections scored only 57% and 62% on a test when taught with traditional lecture. These same students scored only 33% on a test 4 months after completing the course. These studies suggest students' memory for psychology course material is quite poor. We used a noncourse measure of memory for class material and examined whether relevance in our free-recall technique correlated with in-class performance measures.

What will be the specific character of students' memory for course material? In two studies, Kintsch and Bates (1977) examined students' recognition memory of lectures from history of psychology and developmental psychology classes.

They tested whether students recognized verbatim sentences from the lecture that were either related to the course or extraneous to course material. At both 2-day and 5-day intervals, students' recognition memory was better for extraneous material (e.g., jokes) than for course content (for a review of the research on memory for classroom material, see Conway, Cohen, & Stanhope, 1992). According to Kintsch and Bates (1977), students remembered extraneous items better because they were unique and stood out as separate from the standard lecture material. Therefore, we expected students to make frequent references to material not specifically related to course concepts.

## Study 1

### *Method*

**Participants.** Participants were 71 students (37 women, 34 men) enrolled in two sections of Introductory Psychology at a 4-year, undergraduate, liberal arts college. Students enrolled in two different sections taught by the same instructor (first author). Eighty-one percent of the students attended on the administration day. No other administration times were used. Students received extra credit points for participating. They provided either their name or their social security number so that we could match their responses with course grades.

**Procedure.** Students completed response sheets during the last week of the semester. The free-recall response sheet had 10 blank lines for students to complete. The following instructions were printed at the top of the page:

As part of my research on college students' memory for course concepts, and also as a way to improve my teaching of Introductory Psychology, I am interested in what students remember from this course.

Let your mind wander freely as you do this assignment. Think back on the semester as a whole, and re-

**Table 1. Most Memorable Events From Study 1**

Rank	Event	Students Citing <sup>a</sup>
1	Phineas Gage video (video from "The Brain" series, Heimenway, 1988)	46
2	Rat and desensitization (A rat was brought into the classroom, and phobic desensitization was described and briefly simulated)	36
3	"Psychic" demonstration (A series of magic tricks performed by the instructor designed to test critical thinking and debunk the notion of psychic powers)	30
4	Narcolepsy videos (One from ABC's 20/20 [Gaffin, 1994]; the other from an unknown source)	29
5	Milgram obedience video (From videodisc to accompany Myers's, 1996, <i>Social Psychology</i> )	
6 <sup>b</sup>	Prism goggles (Perception demonstration using fresnel prisms made at a local optical shop)	24
	Attitude-behavior demonstration (Randomly assign students to write for and against controversial issue, then measure post-writing attitudes)	24
8 <sup>b</sup>	Demonstration of neuron firing	23
	Classical conditioning/Pavlov	23
10 <sup>b</sup>	Dissociative identity disorder/multiple personality	16
	Schizophrenia	16

Note.  $N = 71$ .

<sup>a</sup>Given in percentages. <sup>b</sup>Indicates tie.

port to me the first 10 things that come to your mind as you answer the question: *What do you remember from this course?*

Don't "edit" your thinking as you report your memories; don't limit yourself in any way; don't worry about your memories being "correct." Simply review the course in your mind and report to me what you remember. It can be anything from the course or the text—stories told in class or in text, questions from tests, comments from other students, videos, activities—literally anything that comes to your mind.

## Results and Discussions

Twenty-five (35%) of the students completed all 10 items ( $M = 8.35$ ,  $SD = 1.6$ ). Table 1 shows the most frequently remembered items. The commonality of these 11 (there was a tie for 10th highest frequency) events is their visual vividness or participatory character. Three items were direct references to videos. All three of these videos were dramatic presentations. The Phineas Gage video re-creates the famous tamping rod piercing Gage's skull. Students in this instructor's courses always react emotionally to this video clip. Both narcolepsy videos show cataplectic attacks in which people fall suddenly to the ground and lose muscle tone. The Milgram video is original footage from one of the Milgram experiments; the participant in the video displays noticeable anxiety. The video also shows the famous "shock board" and its incremental voltage labels. Three other items (schizophrenia, dissociative identity disorder, and classical conditioning) had a video presentation as the major instructional tool. The other five items (rat and desensitization, "psychic" demonstration, prism goggles, attitude-behavior demonstration, demonstration of neuron firing) were in-class demonstrations. Some or all of the students participated in each of these activities.

Students best remembered vivid videos and activities in which they (or their classmates) participated. The next question we asked was whether these videos and activities helped students remember the course concepts any better. We assigned each response a relevance score on a 3-point rating

scale as a measure of the extent to which what students wrote down reflected an understanding of a course concept:

1. *Irrelevant*: No reference to a course concept or completely incorrect. Reference to a video or class activity, with no reference to the concept it meant to illustrate. ("The rod that went through the railroad worker's head.")
2. *Low/medium*:<sup>1</sup> Reference to specific course content, but course concept was mentioned only generally or incompletely. ("The man and the dog and the sleeping disorder where you fall.")
3. *High*: Clear understanding of principle; or reference to a technical, abstract, or specific concept. ("Schizophrenic on the film. Words and thoughts were so disjointed.")

The first author coded all 593 responses. The percentages of irrelevant, low/medium, and high responses were 43%, 42%, and 15%, respectively. A trend, albeit nonsignificant, toward linearly decreasing relevance scores from students' first to last response was present,  $F(1, 24) = 2.25$ ,  $p = .15$ . It was somewhat surprising that this effect was not significant, as we conducted an identical study (unpublished) in which this trend was significant.

Correlations of relevance and quantity of responses with two achievement measures—final grade and test-score percentage—showed significant positive correlations. The students with more frequent or highly relevant memories did better in the course. Final grade correlated with both number of items recalled,  $r(70) = .32$ ,  $p = .007$ , and average relevance score,  $r(70) = .54$ ,  $p < .001$ . Test-score percentage was also positively correlated with number of items recalled,  $r(70) = .32$ ,  $p = .006$ , and average relevance score,  $r(70) = .53$ ,  $p < .001$ .

<sup>1</sup>In another study not reported here, we used a 4-point scale in which we separated low and medium. The rater (first author) found it difficult to distinguish lows from mediums, and therefore the 3-point scale was a better choice.

## Study 2

Study 1 provided a description of students' recollections of their experiences and the relation between these recollections and course achievement. It is interesting to note that all of the most frequently remembered events in Study 1 were either activities or videos. This finding illustrates the power of in-class activities. However, the large number of irrelevant responses suggests that students did not connect their recall of the activities with the concepts they illustrated. These findings are interesting especially to those instructors who use these activities and videos (many of which are probably well known to instructors).

However, the initial purpose of this investigation was to provide an account of students' memory for actual course topics; that is, which topics they best remembered. In an effort to get students to report more content, we changed the instructions in Study 2. The instructions in Study 1 may have created a mental set such that students were inclined to remember such activities more than they would have otherwise.<sup>2</sup> To obtain an account of what course concepts students remembered, Study 2 omitted references to specific events such as videos and activities.

### Method

**Participants.** Participants were 68 students (35 women, 33 men) enrolled in two sections of Introductory Psychology at a 4-year, undergraduate, liberal arts college (different institution than Study 1). The same instructor who taught the Study 1 courses also taught these courses. Attendance was 89% on the day the form was administered. No other administration times were given. Students received extra credit points for participating. They provided either their name or their social security number so that we could match their responses with course grades.

**Procedure.** The procedure was the same as in Study 1, except that the instructions included no references to specific activities (e.g., videos). Students were simply asked to "think back on the semester as a whole, and report to me the first 10 things that come to your mind as you answer the question: What do you remember from this course?" The students completed the task at the end of the final full week of instruction class periods.

### Results and Discussion

Thirty-four (50%) of the students completed all 10 items ( $M = 8.18$ ,  $SD = 2.3$ ). Table 2 shows the most frequently remembered items. Omitting the references to specific activities such as videos seemed to promote student responses that addressed more specific course content. A large majority of responses were to specific course topics (85%). However, although the references listed in Table 2 were mainly to specific

**Table 2. Most Memorable Events From Study 2**

Topic	Students Citing <sup>a</sup>
Sleeping disorders	40
Freud/Freudian theory	38
Schizophrenia	38
Classical conditioning	37
Sexual orientation	29
Eating disorders	28
Major depression	21

*Note.*  $N = 68$ .

<sup>a</sup>Given in percentages.

**Table 3. Frequencies of Responses by Chapter**

Chapter	Chapter No. <sup>a</sup>	Total Responses <sup>b</sup>
Psychological Disorders	15	14.5
States of Consciousness	7	12.0
Motivation	12	11.8
Neuroscience, Genetics, and Behavior	2	10.7
Learning	8	7.9
Developing Child	3	7.2
Personality	14	6.2
Introduction/Thinking Critically With Psychological Science	1	6.0
Emotion	13	4.6
Memory	9	4.1
Perception	6	3.3
Sensation	5	3.1
Therapy	16	3.1
Intelligence	11	1.7
Thinking and Language	10	1.0

<sup>a</sup>Chapters from Myers (1998). <sup>b</sup>Given in percentages.

course concepts, the teaching of five of the seven topics (sleeping disorders, schizophrenia, classical conditioning, eating disorders, and major depression) included a video. Often students cited a concept and also included reference to a video (e.g., "narcolepsy and the cool dogs," referring to a video of narcoleptic dogs). Although a comparison group is not available, we believe these topics are memorable largely because of their accompanying videos. We believe the findings from this study are consistent with Study 1; that is, students' memory is high for highly vivid instructional events such as videos.

Table 3 shows the distribution of recalled items by textbook chapter (Myers, 1998). Most of the chapters received between 2 and 3 days of coverage (50-min class). Students mentioned all chapters except for Adolescence and Adulthood.<sup>3</sup> The introduction is a short, unnumbered chapter, and in Table 3 it is combined with the first chapter.

Students cited the Psychological Disorders, States of Consciousness, and Motivation chapters most frequently. The

<sup>2</sup>We thank an anonymous reviewer for this suggestion.

<sup>3</sup>Social psychology is not included because in this study students completed this exercise before coverage of this chapter. Thus, the Milgram video did not appear as it did in Study 1.

high rate of recall for the States of Consciousness chapter may be a function of the high rate of recall of the topic of sleeping disorders. The high rate of recall for the Motivation chapter may be due to the memorable (and controversial, on this particular campus) discussion of sexual orientation. Students least often recalled Thinking and Language, Intelligence, Therapy, Sensation, and Perception. There was no correlation between the frequency of responses and the order of coverage for the chapters,  $r_s(13) = .07$ .

## General Discussion

This research teaches psychology faculty at least two lessons. First, both studies (Study 1 directly) showed that students remembered vivid anecdotes and demonstrations. In Study 1 the seven most frequently remembered items (Table 1) were activities or videos. Also, of the most frequently remembered items from Study 2, all but Freud had some vivid instructional technique accompanying it—five had videos and one had a controversial lecture and subsequent discussion. The events in Table 1 refer to specific activities and those in Table 2 refer to more general concepts. Recall that our objective of Study 2 was to elicit more conceptual statements from students. We achieved this objective, but students still most frequently recalled those concepts with memorable pedagogical devices. This result adds to the claim that such vivid instructional techniques are the most remembered.

Given the small number of high-relevant ratings in Study 1, it does not appear students very easily connected these in-class activities with the relevant concepts. That better students may be more motivated to write better responses, which will in turn have higher quality ratings, cannot be ruled out. Whether the correlation between high ratings and high course achievement is a result of high skill or high effort (or both) cannot be determined. The fact the correlation exists, however, gives some evidence to the face validity of this free-response technique.

Second, students remembered atypical behavior such as sleeping disorders or schizophrenia. It is not clear whether atypicality increases remembering or simply that videos accompanied the atypical topics. Because atypical behavior lends itself well to teaching by video, escaping a correlation between vividness and teaching technique is difficult. A future study that can (somehow) unconfound topic and technique would clarify this methodological concern.

Many instructors have probably heard from their students that they are “visual learners.” Given that students seem to remember highly visual material in this study, these data may lend support to this claim. The phrase *learning style* seems to imply that there are individual differences in the processing of information. For example, some students are visual learners, whereas others are textual learners. Regardless of whether that claim is true, it perhaps is more helpful to think of learning differences less in terms of styles and more in terms of strategies—effective learners adopt ways to handle different types of material based on their cognitive strengths, the performance requirements (e.g., test vs. paper), and the teaching style of the instructor. We urge caution in interpreting these data as indicating the presence of such individual

differences in learning. Research suggests that students adopt different learning strategies depending, for example, on the nature of the discipline (e.g., VanderStoep, Pintrich, & Fagerlin, 1996).

For teachers of psychology, we see two ways in which these data are helpful. First, it is interesting to document what features of the introductory psychology course students remember. Of course, we recognize that between-subject variability in teaching style, course content, and so forth would make replication of these specific findings difficult. For example, not all instructors employ a “psychic” demonstration or show a schizophrenia video. Still, regardless of the specific activities used, it seems reasonable to assume the events students will most remember are the unique or vivid. We suspect this result will be true regardless of who teaches the course or what material they cover.

Second, instructors may be intrigued to know the correlations between relevance of memory and course performance were positive and significant. Few courses use such a free-recall response format. We suspect many introductory psychology courses, in fact, use recognition memory (e.g., multiple-choice tests) or cued recall (e.g., essay questions with several embedded cues). These studies demonstrated that when students were given no particular cues, their memory relevance correlated positively with achievement. It appears that those who remembered the course well are those who did well in class.

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## Note

Send correspondence to Scott VanderStoep, Department of Psychology, Hope College, P.O. Box 9000, Holland, MI 49422–9000; e-mail: vanderstoep@hope.edu.

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