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Quality of Learning With an Active Versus Passive Motivational Set

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This study tested whether students who learned with an active orientation would be more intrinsically motivated to learn and would learn more than students who learned with a passive orientation. The active orientation was created by having subjects learn material with the expectation of teaching it to another student; the passive orientation was created by having subjects learn the same material with the expectation of being tested on it. The results indicate that subjects who learned in order to teach were more intrinsically motivated, had higher conceptual learning scores, and perceived themselves to be more actively engaged with the environment than subjects who learned in order to be examined. The two groups were equal, however, in their rote learning scores. The effects of exposure to the material were ruled out as an explanation because the two groups reported spending equal time with the material. The results are discussed in terms of intrinsic motivation theory.

Tutoring has long been used to facilitate students' learning; when given individual help, students seem to respond with more interest and improved

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learning. Tutoring has also been shown to have a positive effect on the teacher. For example, Cloward (1967) found that when high school volunteers tutored fourth and fifth graders in reading, the reading of the tutors improved even more than the reading of their pupils. Allen and Feldman (1973) reported similar results. A subsequent study (National Commission on Resources for Youth, 1972) indicated that the gains for teachers may be even more extensive than just improved learning. In this study teenage tutors also gained in self-esteem and perceived competence. Further, Goldschmid (1970) found that students who were tutors as part of a college course reported being more motivated to learn the course material than other students in the course who used different types of learning models. Taken together, these studies suggest that tutoring can enhance learning, motivation, perceived competence, and self-esteem of the tutors.

One obvious explanation for these findings is that the tutoring exposes persons to the material, which facilitates their learning and leaves them feeling better about the material and themselves. However, there may also be other psychological processes involved, such that the process of learning itself is different when one learns material to teach it rather than for some other reason. If this were the case, some of the positive effects of teaching or tutoring could be achieved even before the teaching or tutoring occurred. The study reported in this paper explores this question. It contrasts learning material in order to teach it with learning material in order to be tested on it. We hypothesize that learning material to teach it will lead to enhanced learning and to a more positive emotional tone than learning material to be tested on it, even when the amount of exposure to the material being learned is the same.

The hypothesis is derived from the motivational theory of Deci (1980) and Deci and Ryan (in press), which distinguishes between intrinsic and extrinsic motivational processes. In short, we suggest that learning in order to teach facilitates greater intrinsic motivation than learning in order to be tested, that intrinsically motivated learning is more "active," and that this results in greater learning and in more positive self-related affects and cognitions. Let us consider this in more detail.

First, consider the issue of why expecting to teach might facilitate intrinsic motivation and active learning. According to White (1959) and Deci (1975), intrinsic motivation is based in the need to be effectively self-determining and to have a meaningful impact on one's environment. Being a teacher or tutor can provide the means through which one can have such an impact and could therefore facilitate one's intrinsic motivation. As Bruner (1966) and Rogers (1969) suggested, when one learns things that are useful to a task that one is undertaking, learning will be more active; in other words, there will be a fuller engagement with the material. One

approaches the material with the anticipation of using it, so one becomes more fully involved.

On the other hand, if one is assigned material in order to be tested on it, the learning may be more passive. People may absorb the facts, but they will be less active in interpreting and integrating them. Tests are widely used as instruments of evaluation and control, and many research studies have confirmed that controlling, evaluative events tend to undermine intrinsic motivation and leave people feeling passive (Deci & Ryan, 1980).

Garbarino (1975), for example, studied tutoring where one group of sixth grade girls was rewarded for tutoring second grade children and one group was not. He reported that the tutors who were not rewarded were less critical and demanding and made more efficient use of their time than the tutors who were rewarded. This suggests that tutoring is intrinsically interesting and that the addition of extrinsic incentives may interfere with the intrinsic motivation.

If the expectation of teaching facilitates intrinsic motivation and active engagement with the material to be taught, it is not surprising that learning would improve and feelings would be more positive. In fact, several studies have provided evidence, albeit indirect, to support this assertion. For example, Harter (1981) found that children's intrinsic motivation in the classroom was positively related to their perceived competence in the cognitive domain. Similarly, Deci, Nezlek, and Sheinman (1981) found that children in autonomy-oriented classrooms were more intrinsically motivated and displayed higher self-esteem and perceived cognitive competence than children in control-oriented classrooms. Further, deCharms (1976) reported that children in autonomy-oriented classrooms learned more as measured by standardized achievement tests than children in control-oriented classrooms. From this set of studies, we suggest that autonomy-oriented classrooms tend to promote to a greater degree intrinsic (relative to extrinsic) motivational processes and that intrinsic processes involve higher self-esteem, greater perceived competence, and enhanced learning.

McGraw (1978) reviewed a variety of studies that have shown that learning and the performance of other activities that require attention, creativity, and resourcefulness tend to be worse when people are rewarded extrinsically than when they are not. Because rewards tend to promote extrinsic rather than intrinsic motivation, this evidence suggests that intrinsic motivation tends to result in better performance of complex activities, such as conceptual learning.

There is other, more direct, evidence that learning material with the expectation of teaching it may improve learning, relative to learning it with the expectation of being tested, although the two studies providing this evidence did not consider motivational variables. Zajonc (1960) sug-

gested that the receipt of information instigates a different cognitive set from that required for transmitting information. He found that when subjects were instructed to transmit information, their organization of the material tended to be more differentiated and complex, and tended to show greater unity and organization, than when subjects were instructed to receive the information.

Bargh and Schul (1980) designed a similar experiment. They suggested that when people learn in order to teach they use different cognitive structures that allow greater content-specific learning as well as greater process learning (they learn how to learn) than when they learn without expecting to teach the information. In their experiment one group of subjects studied material with the expectation of teaching it, and another group studied it simply to learn it. The design called for 5 minutes of learning, 3 minutes of being tested with short-answer, recognition and recall questions, then 15 minutes for learning a second passage, and 8 minutes for being tested on it. Their results revealed that the subjects who learned with the expectation of teaching did better on the short-answer exams than subjects who were instructed simply to learn the material.

There are several things to be noted about these two studies. First, both were done for short periods in the psychological laboratory, raising questions about generalizability. Second, although Bargh and Schul suggested that learning in order to teach may affect a person's learning how to learn, their dependent measure considered only content-specific, rote learning. And although Zajonc did use conceptual variables as dependent measures, he employed very simple material, which subjects were asked to organize after they had learned it in a 2-minute reading period. One wonders whether these results would be applicable to situations in which students were, say, reading a week's assignment in physics or history. Finally, although it is certainly important to understand the impact of one's expectations about teaching on one's rote and conceptual learning, the real problem is more general. Learning in order to teach is, we suggest, an instance of the more general case of *active learning*—learning that is done with the expectation of using the material.

The present study explored rote and conceptual learning under conditions of active versus passive learning. This was operationalized by learning done with the expectation of teaching the material versus learning done with the expectation of being tested on it. Because we used a motivational derivation, linking more active learning to intrinsic motivation and more passive learning to extrinsic motivation, we collected data to test the difference in subjects' reported intrinsic motivation when given an active motivational set versus a more passive motivational set.

The structure of the experiment is conceptually similar to that of Bargh and Schul, although in our experiment the procedure was longer (subjects

spent about 2 hours and 40 minutes studying, rather than 20 minutes), the studying was not done in the laboratory, conceptual as well as rote learning was measured, and motivational variables were assessed.

METHOD

Overview

College student subjects were given an article on brain functioning ("The Other Side of the Brain"—Bogen, 1969), which they were asked to take home and learn. The control subjects were told that they would be examined on the material, and the experimental subjects were told that they would teach the contents of the article to another student. When subjects returned to the laboratory 2 weeks later, they completed a questionnaire that assessed their motivation and attitudes, and then they were examined on the material.

Subjects

Forty-three first year students from the University of Rochester's introductory Psychology course responded to a request for subjects to participate in a "Study on Learning." These students were randomly assigned to two groups: 21 in the experimental group and 22 in the control group. One control subject and two experimental subjects failed to appear for the first session, so the experimental group (learning in order to teach) consisted of 19 subjects, and the control group (learning in order to take an exam) consisted of 21 subjects.

Procedure

Subjects reported individually to the laboratory where the learning task was explained to them. Subjects took the article with them to read and study at their leisure during the following week, which was an academic vacation. Subjects were asked to spend about 3 hours studying the article. It was explained that it was not necessary to spend exactly 3 hours, that that was merely a guideline, and that they should spend as long as they wanted or needed. Each subject was asked to keep track of how much time he or she spent studying the article. The article, which was 25 pages long, was a moderately difficult article about brain functioning.

Subjects in the control and experimental conditions were presented with the following instructions:

> Please read the article in the same manner that you would read any article assigned in one of your college courses. Read and study it so that you have learned it as well as you can in a period of about 3 hours. If you are the type of person who learns best by underlining the material, do that. If you prefer to take notes, do that. Use whatever methods are most natural and most beneficial to you for learning the material.

Control subjects were then given the following instructions:

> The purpose of studying and learning the article is so that when you return to the laboratory you will score as high as possible on an examination based on the article. The examination will be like a typical examination based on a reading assignment. Again, use whatever study methods seem most appropriate for you.

Experimental subjects, instead, got the following instructions:

> The purpose of studying and learning the article is so that when you return to the laboratory you will be able to teach the contents to another student. The student to whom you teach the contents will then be given an examination based on the article. The examination will be like a typical examination based on a reading assignment. Again, use whatever study methods seem most appropriate for you.

When a control subject returned to the laboratory, he or she was asked to respond to a short questionnaire that assessed intrinsic interest, and then the subject was given a written, 24-item examination on the article. Following the examination, the subject was debriefed.

When an experimental subject returned to the laboratory, he or she was given the same short questionnaire and the same exam. It was explained to these subjects, before they took the exam, that some participants were being selected at random to take the same examination that would eventually be administered to their students. The purpose of this unexpected exam, they were told, was to enable the investigators to understand the learning process better by first looking at how well the teacher understands the material and, in comparison, how well his or her student comes to understand the same material. The experimental subjects never actually taught the material. Following the exam, the subjects were debriefed.

Dependent Measures

The three dependent measures for assessing intrinsic motivation asked (a) how interesting subjects found the contents of the learning material, (b) how enjoyable they found the experiment, and (c) how much additional time they were willing to volunteer for the experiment. The answer to the questions in interest and enjoyment were given by circling a number on a 10-point, Likert-type scale. The answer to the third question was given on a 6-point scale ranging from 0 hours to 5 or more hours.

The active/passive dimension, which served as a manipulation check, was measured on two 10-point scales that were given on a separate sheet, after the intrinsic motivation questions. The scales ranged from 1 (extremely passive) to 10 (extremely active) in response to the following two questions: (a) When a teacher assigns a particular reading to you such that he or she might examine you on it, how active or passive do you perceive

yourself to be in dealing with your environment? (b) When a teacher assigns a particular reading to you such that you might teach the material to another student, how active or passive do you perceive yourself to be in dealing with your environment?

The dependent measure to assess learning was a 24-item examination that included the following question types: true/false, fill in the blanks, definitions, multiple choice, identifications, and explanations. Each question was designed primarily to measure either rote memory or conceptual understanding of the material. Fifty percent of the point value of the examination was allotted to each of these two types of learning.

Questions were categorized as "rote" or "conceptual" in the following manner. Two of our colleagues studied the article and then took a longer version of the exam, rating each question on the rote/conceptual dimension. Only those items that received an identical rote/conceptual classification by the two independent raters were used in the study. Subsequently, another colleague, who was blind to the conditions and hypotheses of the experiment, scored the subjects' answers.

RESULTS

The differences that were predicted for the two groups were based on the assumption that learning in order to teach would promote a more active engagement with the material than learning in order to be tested. This was verified by having subjects rate the activity/passivity of the two types of learning.

Subjects who learned in order to teach rated the activity dimension "learning in order to teach" quite high ($\bar{X} = 8.47$). These same subjects rated "learning in order to be examined" as significantly less active ($\bar{X} = 4.63$). On the other hand, subjects who had learned in order to be examined did not perceive the two types of learning as differentially active. Learning in order to teach had a mean rating of 7.72, and learning in order to be examined had a mean rating of 7.09. When the data for all subjects were combined the differences were significant at the .001 level. Still, the different responses of the two groups are quite striking and will be discussed. The actual manipulation check for this experiment compares the perceived activity of "learning in order to teach" by those subjects who learned in order to teach ($\bar{X} = 8.47$) with the perceived activity of "learning in order to be examined" by those who learned in order to be examined ($\bar{X} = 7.09$). This difference is significant ($t = 2.53$; $df = 38$; $p < .02$). Thus, the manipulation was successful.

Data relevant to subjects' intrinsic motivation appear in Table I. Subjects who learned in order to teach expressed more interest in the material ($t = 3.52$; $p < .001$), more enjoyment of the experiment ($t = 3.01$; $p < .01$), and more willingness to return ($t = 2.36$; $p < .05$). Thus, the data confirm

that subjects who learned with the expectation of teaching were more intrinsically motivated than subjects who learned with the expectation of being examined.[1]

Table II presents the mean learning scores, rote and conceptual, for the experimental and control groups (maximum scores on each part were 24). Subjects who learned in order to teach evidenced significantly greater conceptual learning than subjects who learned in order to be tested ($t = 5.42$; $df = 38$; $p < .001$), although the two groups did not differ on rote learning ($t = 1.39$).

As indicated earlier, subjects were asked to keep track of how long they spent learning the material, after it was suggested that they spend approximately 3 hours. Results revealed no difference in the amount of time spent ($t = .69$); the experimental group reported spending an average of 2.55 hours working on the material, and the control group reported spending an average of 2.71 hours.

[1] Correlations among these three measures of intrinsic motivation indicated that there is considerable shared variance. The three correlations among the three pairs of questions were .73, .60, and .63.

TABLE I

Means and Standard Deviations on Levels of Interest in the Learned Material, Enjoyment of Participation in the Experiment, and Willingness To Participate Further

	Experimental ($n = 19$)	Control ($n = 21$)
Interest	7.13	4.43
	(2.41)	(2.30)
Enjoyment	7.00	4.67
	(2.27)	(2.50)
Participation	2.11	.76
	(2.34)	(.68)

TABLE II

Means and Standard Deviations of Rote and Conceptual Learning Scores

	Experimental ($n = 19$)	Control ($n = 21$)
Rote learning score	18.21	16.24
	(4.58)	(4.13)
Conceptual learning score	18.84	10.76
	(4.89)	(4.23)

DISCUSSION

This study tested the hypothesis that having subjects learn material in order to teach it would create a more active orientation, facilitating intrinsic motivation and resulting in greater learning, than having them learn material in order to be tested on it. Results strongly supported this hypothesis. Subjects who learned material to teach it expressed greater evidence of intrinsic motivation and reported feeling more active in their learning than subjects who learned the material to be tested on it. Further, the experimental subjects demonstrated greater conceptual understanding of the material than the control subjects.

The learning results complement those of Zajonc (1960). In our study, subjects took the material home to study as they typically do, thereby adding to the external validity of our results at the expense of internal validity, since their learning could not be monitored. On the other hand, in the Zajonc study, subjects' learning was monitored in the laboratory over a short period, adding to the internal validity at the expense of external validity. The combination of results, both showing that active learning—learning in order to use the material—led to greater conceptual learning, represents a rather convincing case.

A related question has to do with subjects' rote learning. Bargh and Schul (1980) found that learning in order to teach improved subjects' rote learning relative to learning in order to be tested. We found no significant difference between the two groups on rote learning. It is probable that our failure to find the difference is a reflection of the high external validity of our study for our subject population. Undergraduates in a competitive setting have become adept at learning material in order to pass exams. Even though the exams may interfere with their conceptual integration of the material, they have become quite proficient at memorizing the material that is necessary for exams. With the external validity of this study being so high, the students were probably behaving just as they usually do.

An interesting finding with respect to perceived activity/passivity was that subjects who learned in order to teach perceived themselves to be very active in the teaching paradigm and very passive in the examination paradigm. In sharp contrast, subjects functioning in the traditional learning-in-order-to-be-examined paradigm perceived no significant activity/passivity differences between their paradigm and one in which they would learn material in order to teach it to others. In making these contrasting perceptions, the experimental subjects were operating from personal knowledge unique to subjects in their group. They were able to compare their subjective impressions relating to the learning-in-order-to-teach paradigm in which they had just functioned, with the traditional learning-in-order-to-be-examined paradigm in which they frequently function. The control subjects, however, were asked to discriminate between activity/

passivity levels in the traditional examination paradigm and a teaching paradigm about which they probably had no personal knowledge. This is an interesting finding because it indicates that students need to have had a recent experience with a more active type of learning paradigm to recognize the passivity of the traditional examination paradigm.

In summary, we argue that the opportunity to use information to act on one's environment facilitates intrinsic motivation for learning that information and results in improved conceptual learning, relative to learning that is aimed merely at passing an examination. Given that the aim of most educators is to promote conceptual learning, educational climates and procedures that facilitate intrinsically motivated learning would seem to be of central importance.

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