THE INFLUENCE OF MOTIVATIONAL VARIABLES ON TEXT LEARNING

by

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(Under the direction of JAMES M. BROWN)

ABSTRACT

This study examined the effects of intrinsic (personal interest) and extrinsic motivation on quality of text processing and learning behaviors. It also tested the hypothesis of an undermining effect of reward on personal interest. There was no evidence that offer of a performance-contingent reward affected interest, but some evidence of effects on quality of performance and learning behaviors. The contingent group formed *both* stronger verbatim representations (shallow processing) and situational representations (deep processing), and reported more rehearsal as a learning strategy. High topic interest participants also formed stronger verbatim and situational representations. They emphasized elaboration as a learning strategy. Both reward and interest were significantly correlated with concentration, as well as with reading times. On the Ordered Tree Technique (OTT), interest correlated with two measures of organization for the Biological Conservation text, and similarity to expert for the Medical Anthropology text. OTT showed promise for evaluation of texts as well as studying text processing.

INDEX WORDS: Topic Interest, Extrinsic Motivation, Text Comprehension Test, Ordered Tree Technique

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LITERATURE REVIEW

In addition to the knowledge and skills needed to learn, educators generally consider that motivation is indispensable. The concepts of *interest* and *extrinsic vs. intrinsic motivation* are both relevant to consideration of student motivation. However, motivation research involving these constructs has tended to proceed along separate lines with very little overlap. The effects of interest on learning and the effects of reward on intrinsic motivation have both been studied in detail, but largely in isolation from each other (Hidi, 2001).

Early in the discussion of motivation in education, John Dewey (1913) stressed the importance of interest. He believed that interested students would learn in a qualitatively different way from students who were just expending effort because they were required to do so. However, emphasis on interest and intrinsic motivation declined with the rise of behaviorism and the focus on the positive effects of extrinsic reward on learning. (Deci, Koestner, & Ryan, 1999). Some authors have criticized cognitive psychologists for their failure to view motivational variables as important for learning (e.g., Lepper, 1988, Pervin, 1992).

More recently there has been renewed investigation of the relationship between interest (motivation) and various criteria of learning (e.g., Graham & Golan, 1991; Pintrich & Garcia, 1991; Snow, 1989; Hidi & Baird, 1986). In particular, Schiefele and colleagues (e.g.1990, 1991, 1996, 1999, 2001) have examined the relationship between interest and text learning. This research has demonstrated that motivational variables (particularly interest) have a significant effect on text learning. (Schiefele, 1999). Schiefele has pointed out that cognitive psychology has developed new tools for research: "complex indicators of comprehension and learning" (Schiefele, 1996, p. 3) that can be very useful for studying these relationships. This effect is not "simple" or unidimensional. There is some evidence that motivational factors affect different criteria of learning in different ways. (Schiefele, 1999).

At about the same time, in response to behaviorism, a separate line of research disputed the positive effects of reward (Deci, 1971,1972; Lepper, et al., 1973) claiming that reward undermines intrinsic motivation. Despite the fact that this line of research has expanded greatly and in many directions, the basic undermining effect of reward is still controversial (Deci, Koestner, & Ryan 1999; Eisenberger, Pierce, & Cameron, 1999).

Hidi (2001) believes that currently new theoretical orientations allow for a more balanced view combining intrinsic and extrinsic factors. However, most educators still have a strong belief that intrinsic motivation is superior to learning motivated by incentives and extrinsic reward (Hidi & Harackawiecz, 2000). When Lepper et al (2005) reported that intrinsic motivation in school children declined with grade level, their first explanation blamed the increasing use of external rewards and constraints in school.

To date, there has been no research that compares the effects of *personal interest* and *extrinsic reward* in the same study. No effort has been made to compare intrinsically motivated text processing with processing based on extrinsic motivation (Schiefele (1999). Hidi (2000) commented, "in fact, there is no relevant literature in this field of which I am aware that has considered the association between rewards and interest." (p. 311) The purpose of the present research is to bridge this gap.

Conceptual Basis of Research

Focus on Text Learning

This study is concerned with the effects of personal interest and reward in an academic context. The learning task involves reading text passages taken from introductory textbooks. The text passages represent expository material of the type and level generally used as part of a college curriculum.

Types of Interest

There are considered to be two types of interest: situational (or text-based) and personal (or individual). *Situational interest* is conceived of as a temporary psychological state that is evoked by particular text characteristics (Schiefele, 1999). There has been abundant research on

what makes text materials more or less interesting to readers. For example, text interestingness has been said to be affected by inherent themes such as violence, sex, death, disease, etc. (Schank, 1979) or themes that interact with the reader's value system such as their judgments of right vs. wrong (Hidi & Baird, 1988), content manipulations such as concreteness/image ability (Sadoski, Goetz, & Fritz, 1993), seductive details (Garner, Brown, Sanders, & Menke, 1992; Garner, Gillingham, & White, 1989), novelty (Wade & Adams, 1990), humor (Kintsch and Bates, 1977), organizational characteristics such as text organization (Sawyer, 1991) text difficulty and considerateness (Armbruster, 1984), and by the manipulating of the readers' purposes for reading by use of external cues (Lave & Wenger, 1991), incongruity resolution (Iran-Nejad, 1987, Iran-Nejad & Cecil, 1992), expectation violation (Schank, 1979), and challenging the reader's beliefs (Davis, 1971, Schank, 1979; Tang, 1994).

Researchers who study situational interest argue that the characteristics of the text are much easier to manipulate than characteristics of the learner, so that is where their efforts are directed. However, making texts more interesting sometimes backfires. For example, extraneous remarks and jokes are often recalled better than the main ideas of a lecture (Kintsch & Bates, 1977). Similarly, adults given text with seductive details were less able to recall main ideas. (Garner, Gillingham & White, 1989; Garner, Brown, Sanders & Menke, 1992). Hidi and Baird (1988) found that writing texts in a way that increased interest was most effective for recall of concrete, specific or personally relevant information, but did not improve learning of information that was more abstract, general or scientific. Further, Hidi (2000) has pointed out that it is not always possible to make all the material that must be learned interesting, especially at higher levels of education. Even if it were, Dewey (cited in Garner et al, 1992) advised against trying to *make* something interesting.

By contrast, *personal interest* is regarded as a relatively stable positive orientation of the learner toward a certain area (e.g. knowledge, activities or events) (Schiefele, 1999). *Personal interest* is a motivational characteristic that the person brings to the situation. More specifically, Schiefele (1991, 1996, 1999) has elaborated a multidimensional concept of personal interest.

Personal interest is defined by *intrinsic valence beliefs* that exist in the individual's cognitive system (long-term memory) *(*Schiefele, 1999). Starting from Pekrun's 1988 classification system, Schiefele (1999) proposed that *valence beliefs* represent the degree to which the individual anticipates a positive or negative experience as a result of engagement with specific objects (knowledge domains, topics, activities or events). These evaluations are either feeling-related or value-related. Feeling-related attributes refer to the range of feelings that can be associated with an object (e.g. boredom or excitement in the case of an intellectual content area.) Value-related attributes refer to how important the person perceives a given object to be, the extent to which it is seen as worthwhile and valuable.

Prior knowledge is sometimes included in the definition of topic (personal) interest. For example, Renninger (1990, 2000) defines topic interest as composed of stored knowledge and stored value. However, the present research follows Schiefele (1998, 1999) in regarding prior knowledge as independent of interest. Prior knowledge does not necessarily influence interest or text learning but under certain circumstances may do so; for example, when the material is difficult and/or there are large differences in prior knowledge, such as between novices and experts (Tobias, 1994; Schiefele, 1999).

Of course, people can be interested in many things other than text materials (e.g. sports activities, hobbies, etc). However, Schiefele (2001) maintains that the concept of personal interest should be reserved for knowledge domains and not used to refer to activities or events. Since this is not always the case, for the sake of clarity the term *topic interest* is often used to indicate a narrower focus on text learning. Ainley, Hidi & Berndorff (1999, 2002) point out that some researchers have treated topic interest as a form of situational interest (e.g. Hidi & McLaren, 1990, 1991) while others (e.g. Schiefele, 1996; Schiefele & Krapp, 1996) regard it as more sustained personal or individual interest. The present research is concerned with topic interest as a form of personal (individual) interest.

Types of Motivation

Conventionally, there are considered to be two types of motivation: *intrinsic* and *extrinsic*. In relation to text learning, intrinsic motivation drives a person to engage in a learning activity because direct pleasure is derived from it; the satisfaction comes from the activity itself rather than some favorable consequence. For example, students choose to read about certain topics because they anticipate pleasure in learning more about that given subject (personal interest) or because the subject is presented in a very novel or challenging way (situational interest). Motivation arising from either personal or situational interest is regarded as intrinsic (Schiefele, 1998). However, personal interest is seen as relatively stable, while situational interest is transitory and text-dependent.

Extrinsic motivation, on the other hand, drives a person to engage in a learning activity in order to obtain something valued in return, such as a good grade, or to avoid unpleasant consequences, such as failing the course. It is the outcome of the activity that provides the motivation rather than the activity itself. In short, intrinsic motivation comes from an enjoyable process; extrinsic motivation comes from a desired outcome.

How Topic Interest Affects Text Learning

A meta-analysis of studies between 1951 and 1994 done by Schiefele (1999) found 22 relevant studies of the relationship between topic interest and text learning that reported an average correlation of .27 ($p<.01$). The relation between interest and learning was independent of text length, type of text (narrative or expository), type of learning test (recognition vs. recall) age, reading ability, prior knowledge and text difficulty. Also, 14 studies relating situational interest to text learning reported an average positive correlation of .33 ($p<.05$).

Several studies have indicated that interest affects deep-level learning more than surface-level learning. For example, an early study by Groff (1962), using a multiple-choice comprehension test, found that interest was more strongly related to deep-level comprehension than to surface-level comprehension. Kunz, Drewniak, Hatalak, and Schon (1992 cited in

Schiefele, 1999) used free recall, multiple choice comprehension, and application questions. They reported that interest was more strongly related to deep-level learning.

However, as pointed out by Schiefele (1990, 1996, 1999) most of the studies of the effects of interest on text learning have had one or both of the following deficiencies: use of a simplistic measure of interest (often a single item rating) and/or a non-theory based, intuitive measure of text learning. To remedy the first problem Schiefele (1990, 1996) developed a two-part topic interest questionnaire. Participants were presented with a brief summary of a text. First, they were asked to predict how they thought they would feel while reading about the topic of the text (feeling-related valences) by rating various adjectives: ("While reading the text on_____I expect to feel….'bored', 'stimulated', 'involved'," etc.) Second, they were asked to predict how much value they would find in the text (value-related valences) by rating adjectives such as "meaningful", "useful", etc. Scores on both sections were combined to yield a topic interest score. According to Schiefele (1990, 1991, 1996), studies have shown that this measure is unidimensional and highly reliable.

Using the topic interest questionnaire, Schiefele and his colleagues conducted studies involving male undergraduates who were identified as belonging to either a high-interest or a low-interest group based on questionnaire scores. In one study, (Schiefele, 1990) results of a comprehension test supported the hypothesis that interest has the greatest effect on deeper levels of text comprehension. A second study (Schiefele & Krapp, 1996) measured depth of learning based on analysis of free recall. Significant relationships were found between topic interest and recall for the variables that presumably revealed a deeper level of processing.

Evidence from these and similar studies provided support for the view that persons who have a high degree of interest in a topic will engage in a deeper level of processing. They will focus more on the meaning of the text, make more inferences, and recall more main ideas. However, Schiefele (1991, 1996) expressed dissatisfaction with some of the methodology of the studies used to reach this conclusion. Measures involving free recall are inherently limited because one cannot be positive that highly interested readers are really using a different type of

text processing. The same differences might result from a retrieval effect. That is, the less interested readers might be less likely to recall material at the time of the test even though they may have encoded the material while reading. With respect to answering the deeper comprehension questions, the less interested participants might simply not have been motivated to work hard on the recall tasks.

Schiefele (1991) was also dissatisfied with the typical measures used in his and other studies because they were intuitively based and did not derive from any theoretical framework. He chose the text processing theory of van Dijk and Kintsch (1983; Kintsch, 1986) as the most adequate basis for constructing a theoretically well-founded test of differences in text processing.

This theory distinguishes three different text representations that readers form as they read (Kintsch and van Dijk, 1978 as cited in Singer, 1990). The first level of representation is the verbatim level, which represents the actual words of the text. The verbatim representation is the shallowest level of representation. The second level of representation is the propositional level. A proposition represents an idea contained in the text. It can be thought of as a sentence that directly represents the meaning of one idea in the text. The individual propositions are organized by the reader into a network, or microstructure. The propositional level includes a second structured network, or macrostructure, that reflects the main idea or gist of the text. Together these form the text base. The text base contains the ideas that are explicit in the text.

In order to understand what is being communicated, the reader also must construct a mental representation of the situation described in the text. This third level of representation is termed the situation model, or situational representation. The situational representation is considered the deepest level of representation. Situational representations integrate ideas from the text with the reader's general knowledge. For example, if the text refers to an electronics plant in rural Malaysia (as it does in one text passage used in the study), the events described in the text will combine with the reader's knowledge (real or imagined) about such factories in order to create a situation model. Schiefele (1991), created a test to measure the strength of

verbatim, propositional, and situational representations. (This test will be described in detail in the Methods section.)

In studies using Schiefele's recognition test of depth of processing (Schiefele, 1991, 1996), topic interest was consistently reported to affect only verbatim and propositional representations. As Schiefele predicted, high-interest participants had higher scores on propositional representations than low-interest participants, while low-interest participants were more likely to have higher scores on verbatim representations of the text. The prediction that topic interest would affect the situational representation (situation model) was not borne out. However, Schiefele speculated that this failure to support the hypothesis might be due to problems with the recognition test, especially since there are no clear-cut guidelines for constructing the test. The finding that the strength of the situational representation was significantly related to ability level implies that the test does assess a deeper level of processing which could be more dependent on intelligence than interest. Despite the somewhat equivocal nature of these results, they provide enough support for the idea that level of interest affects level of processing to warrant further investigation.

Ordered Tree Technique

A second approach to measuring the effects of topic interest and reward on cognitive processing is based on the Ordered Tree Technique. Previous studies suggested that it is possible to use a treelike structure of concepts to represent students' under-standing of the subject matter of a course (Novak & Gowin, 1984; Reitman & Rueter, 1980). Most users of the technique employed free recall to describe the cognitive structure. However, Naveh-Benjamin, McKeachie, Lin, and Tucker (1986) tried to eliminate the element of retrieval from the task by providing a list of concepts to be organized. They modified a method for measuring students' cognitive structures that was originally developed by Reitman and Rueter (1980). Using the premise that participants usually remember all of those ideas that are connected to each other through associative links before attempting to remember the next cluster of ideas that are linked to one another, Reitman and Rueter created a method for analyzing the recall of words on both cued and

uncued trials. The algorithm that they created discovered the set of all chunks for each participant and represents this set as an “ordered tree”. The ordered tree obtained from such an analysis is regarded as a representation of the individual’s cognitive structure.

The ordered tree technique is based on a theory of how the mind might be organized (cf. Johnson, 1972). The theory states that single concepts or sets of concepts are organized in a hierarchical structure. Several different measures can be derived from the ordered tree technique that are useful for comparing different cognitive structures. One of the measures can be used to compare the similarity of the students’ ordered tree to that of an expert. Previous research has shown that this measure of cognitive structure is positively related to student achievement in a course, with the expert being the course instructor (Naveh-Benjamin et al., 1986). It has also been used to measure the effect of test anxiety on learning course material (Lin, McKeachie, & Naveh-Benjamin, 1999). The present study is the first time that the ordered tree technique has been used to measure learning from expository text. In all previous studies the technique was used to measure cognitive structure developed over a longer period of time such as a course or to compare novices with experts. Although this was something of a gamble, the author was encouraged to take the risk by one of the researchers familiar with the technique, who thought it was a reasonable idea (W. K. McKeachie, personal communication, January 8, 2003).

Thus, the present study used two different theoretically based measures of depth of processing. Hopefully, these will complement one another and address Schiefele’s criticism that most studies use only one, intuitive measure of text learning.

In addition to investigating the impact of topic interest on text comprehension, Schiefele and colleagues looked for mediating variables. In a 1996 study, Schiefele explored the role of quality of experience. He found that, while interest was correlated with positive experience during reading, "none of the dimensions of experience was significantly correlated with any of the components of text representation" (Schiefele, 1996, p.13). Schiefele and Krapp (1996) examined a number of process variables: arousal, attention, elaborations, underlining and margin notes. Topic interest was found to be significantly related to arousal, intensity of attention,

elaborations, and note taking, but not to persistence of attention (reading time) and underlining. However, there was no evidence that any of these variables had any substantial mediating effects.

Effects of Extrinsic Motivation on Intrinsic Motivation

For much of the twentieth century, educational psychology has tended to focus on extrinsic motivation. H. Schiefele (as cited in Schiefele, 2001) attributes this to the ascendancy of the expectancy-value paradigm in psychological research on motivation. In particular, he specifies the influence of achievement motivation theory, which ignored intrinsic (or inherent) incentives in an activity. Even researchers (e g. Rheinberg, 1985, 1996a as cited in Schiefele, 1999) who have investigated incentives which are inherent in the activity (i.e., intrinsic) have focused on activities such as motorcycling, painting, surfing, playing music, etc. that are quite different from reading or academic learning. Another influence has been Skinner's behaviorist theory and its translation into behavior modification in the classroom. Skinner's emphasis on external positive reinforcement seemed to have directed educators to think primarily in terms of external rewards. Approaches to improving learning as well as behavior relied on providing positive reinforcements in the form of praise, extra credits, prizes, and opportunities to engage in preferred activities, etc. In the seventies, this approach was challenged by the work of Deci (1971, 1972) and Lepper, Greene and Nisbett (1973) and others who claimed that although external positive reinforcement might increase the likelihood that a behavior would be performed, it would undermine the students' intrinsic motivation (or interest) in engaging in the behavior. When the positive reinforcement contingency was removed, the students would be less likely to engage in the behavior than before they were rewarded because their intrinsic motivation would be decreased.

In the classic experimental paradigm, participants were given puzzles or other relatively brief tasks which were either assumed to be intrinsically interesting or rated as such by previous participants (Deci et al., 1999). The experimental group was given a tangible reward (often money) for engaging in the task, completing it or performing well. Later studies included verbal rewards (termed positive feedback.). After the period identified as the experimental session, the

participants were given a period of supposedly free time (although they were being observed without their knowledge) in which they could continue working on the target task, read magazines or do whatever else they wished. The amount of time they spent working on the target task with no anticipation of reward was used as a measure of their intrinsic interest or motivation. Self-report measures also were used in addition to, or as a replacement for, the behavior measures. Experiments involving college students were usually completed in one session, whereas experiments with young children were often extended to three sessions. (Tang & Hall, 1995). In general, participants who were rewarded for work on the task spent less of their free time doing it during the "free choice period" than did those who were not given any reward. Subsequent research (see Deci, 1976 review; Deci et al., 1999) clarified that reward had to be contingent on performing the task; noncontingent or unexpected monetary reward had no effect on intrinsic motivation. Similarly, verbal rewards such as praise or other positive feedback were found not to undermine intrinsic motivation (Deci et al., 1999).

Deci also looked at the effects of negative reinforcement. In Deci and Cascio (as cited in Deci, 1975a) a buzzer was sounded to threaten poor performance. It was found that intrinsic motivation decreased when students solved puzzles under the threat of punishment as compared to those students who solved the same puzzles but were not threatened with punishment. Deci, Cascio, and Krusell (as cited in Deci, 1975a) also examined the effect of negative verbal feedback on intrinsic motivation. The verbal feedback involved negative social comparison. If students failed the task, they were told that their performance was below average; that most other students had been able to perform the task. If they succeeded, they were informed that they had performed more slowly than the other students had. This type of negative feedback was found to decrease the intrinsic motivation of the students.

Theoretical Approaches

Cognitive Evaluation Theory

The research findings cited above were interpreted in terms of Cognitive Evaluation Theory (CET) (Deci, 1971, 1975b, Deci et al., 1999). CET proposed that to understand the

effects of rewards it is necessary to take into account how the individuals are likely to interpret the meaning of the reward. In line with the ideas of deCharms (1968) about the importance of perceived locus of causality (i.e., being an "origin" instead of a "pawn") and those of White (1959) who wrote about competence motivation, Deci theorized that the most important consideration would be how the rewards affected the recipients own feelings of self-determination (i.e., autonomy) and competence. On the basis of a number of studies, Deci and Ryan (1980, 1985) developed a detailed statement of Cognitive Evaluation Theory. CET states that psychological needs for autonomy and competence underlay intrinsic motivation. Therefore, the effect of a reward depends on how it influences perceived self-determination and perceived competence. Intrinsic motivation is increased by events that provide need satisfaction and decreased by events that thwart need satisfaction. CET proposes that rewards may be interpreted in two ways: either as controlling behavior (making the recipient do something) or as giving information about competence. Rewards that are perceived as controllers of behavior block satisfaction of the need for autonomy; they lead to perception of a more external locus of causality (deCharms, 1968), and thus decrease intrinsic motivation. This is called the undermining effect. By contrast, rewards that give positive information are predicted to provide satisfaction of the need for competence, and therefore increase intrinsic motivation.

The finding that verbal reward (positive feedback) does not diminish intrinsic motivation was explained by the idea that positive feedback supports feelings of competence and therefore does not impair intrinsic motivation. Similarly, some studies reported that even tangible reward (such as money) did not decrease intrinsic motivation if it was interpreted by participants as giving positive information about competence; that is, they were getting the reward because they had performed well (Weinberg & Jackson, 1979. To summarize briefly, CET holds that what determines whether or not reward decreases intrinsic motivation is how the reward affects feelings of competence and self-determination.

Types of rewards. To predict the effects of tangible rewards on intrinsic motivation, it is necessary to know if the rewards are expected and what specific behaviors are required to receive

the rewards. Unexpected rewards are not predicted to decrease intrinsic motivation because if the person does not know about the reward while working on the task, the reward will not be experienced as controlling (Deci et al., 1999). Rewards that are based on performing specific behaviors are termed *contingent* (Ryan et al, 1983). Task-contingent rewards may be contingent on simply engaging in the target task (engagement-contingent) or on completing the target task (completion-contingent) (Deci, et al., 1999). Performance-contingent rewards are given for quality of performance, meeting some standard of excellence or fulfilling some specified criterion. (Usually, but not always, all members of the experimental group are led to believe that they satisfied the reward criterion). According to Deci et al. (1999) rewards are termed noncontingent if they are given for something other than engaging in the target task, "such as simply participating in the study"(p. 634).

CET uses reward contingencies as a basis for predicting what types of rewards tend to be interpreted as controlling versus affirming competence. (The following discussion is based largely on Deci et al., 1999). Task non-contingent rewards do not require doing anything beyond agreeing to participate in the activity. Accordingly, there is no reason to expect these rewards to be experienced as either informational or controlling with respect to the task. Thus, task non-contingent rewards are not predicted to affect intrinsic motivation either way. Engagement-contingent rewards are predicted to be experienced as controlling because people are expected to do some work to get the reward, but there is negligible affirmation of competence. Therefore, engagement-contingent rewards are predicted to *decrease* intrinsic motivation. CET further theorizes that completion-contingent rewards are likely to be experienced as even more controlling because more work is expected of the person, but on the other hand, receiving a reward upon completion of a task is assumed to affirm some level of competence that might offset the controlling aspect of the reward. However, in general, the competence-affirming aspect is not expected to be as strong as the controlling aspect, so a *decrease* in intrinsic motivation is predicted comparable to that for engagement-contingent rewards.

CET states that performance-contingent rewards exert the strongest form of control so there will be a strong tendency to decrease intrinsic motivation. However, performance-contingent rewards affirm competence when the person is able to meet the standard required to earn the reward. For example, when participants are told they will get a reward if they do better than 80% of the participants, and then they receive the reward. In this situation, performance-contingent rewards are predicted to have both positive and negative effects, and the outcome is thought to depend on other factors such as interpersonal climate or level of reward in comparison to others.

Interest level. According to the theory, in order for the undermining effect to occur, the activity being rewarded should be intrinsically interesting. CET does not apply to uninteresting tasks. It is contended that extrinsic reward will not have any effect on intrinsic motivation when the task is not interesting (Deci & Ryan, 1985; Deci et al., 1999). In a 1999 meta-analysis, Deci, Koestner and Ryan found thirteen studies that manipulated the task interest level. No studies were found that examined the effect of reward on personal interest. Thus far, the theory has been applied only to situational interest. For 11 studies using a free-choice measure, reward produced a significant undermining effect for interesting tasks but not for uninteresting tasks (Deci et al., 1999). Only 5 studies used a self-report measure. No results were reported for these studies. However, some researchers have reported that extrinsic reward can increase intrinsic motivation when initial interest in the task is low (Loveland & Olley, 1979; Eisenberger, Pierce, & Cameron, 1999; Tang & Hall, 1995).

Attributional Approach

Shortly after Deci began his work with college students, Lepper, Greene and Nesbett (1973) carried out a study with children, which used drawing with magic marker as the intrinsically interesting activity. They found that children who were rewarded for drawing were less likely to continue engaging in the activity in the free choice period than children who had not been rewarded. Lepper and colleagues interpreted their findings in terms of self-perception theory, a form of attribution theory. They argued that someone who initially does something with

no expectation of reward will think, “I’m doing this because I want to, like to, it’s enjoyable”, etc. However, when and if the individuals are paid to perform the activity, they will reason that it is now being done for the reward rather than because it is intrinsically enjoyable. In attribution theory, the effect of extrinsic reward on intrinsic motivation is termed the *overjustification effect*. This is “the proposition that a person’s intrinsic motivation in an activity may be decreased by inducing him to engage in that activity as an explicit means to some extrinsic goal” (Lepper et al., 1973, p 130). Individuals who do something for a substantial reward are presumed to judge that the reward is the reason they are performing the task. The basic predictions of the two theories are similar: particularly that, on the whole, reward will decrease intrinsic motivation by decreasing perceived self-determination.

Behaviorist Position

In contrast, the behaviorist position as argued by Eisenberger, Cameron, Pierce, and Rhoades (Eisenberger & Cameron, 1996; Eisenberger, Rhoades, and Cameron, 1999; Eisenberger, Pierce & Cameron, 1999) disagrees, claiming that reward increases perceived self-determination, especially a performance-contingent reward. They maintain that the promise or repeated use of reward communicates lack of control rather than control: It conveys the idea that (a) the person who is giving the reward is unable to control the behavior of the recipient without offering something in return and (b) the potential reward recipient can choose to refuse the reward and not do what is requested. Therefore, reward should increase, rather than decrease, perceived autonomy, or self-determination. They further explain that reward can decrease intrinsic motivation when it suggests that the task is not related to competence (because everybody gets one no matter what the quality of the performance or the task is very simple) or when the reward is so trivial that it suggests that the task is unimportant.

Meta-analyses

Competing theoretical interpretations of the phenomenon that under certain circumstances reward decreases intrinsic motivation have given rise to at least five relatively recent meta-analyses (Rummel & Feinberg, 1988, Wiersma, 1992, Tang & Hall, 1995, Cameron,

& Pierce, 1994, ((Eisenberger & Cameron, 1996 is a revision of Cameron & Pierce, 1994)) Deci et al., 1999) and a great deal of debate about them.

To summarize the results briefly, Rummel & Feinberg, (1988) focused exclusively on rewards that they judged to appear controlling. For 45 studies they reported 83 effect sizes showing the undermining effect and 5 that showed increase of intrinsic motivation. They concluded there was strong support for CET and the undermining effect. Wiersma (1992) analyzed 20 studies that involved free-choice behavior as dependent measures. His results also supported the undermining effect. Tang and Hall (1995) looked at 50 studies to evaluate specific hypotheses about what they termed the "overjustification effect." They found that both overall task-contingent rewards and performance-contingent rewards decreased intrinsic motivation, but unexpected rewards had no significant effect. There were two situations in which the results were inconsistent with predictions from theory. In opposition to Deci and Ryan's (1985) contention that reward would not increase initially low interest, there was evidence that, for college students, contingent reward could increase interest. There was also some evidence that even a noncontingent reward could increase college students' interest.

Cameron and Pierce (1994) did not find any overall effect of reward on behavior in free-choice periods, but significant *increase* in intrinsic motivation on self-report measures. There was no effect for task-noncontingent rewards on either behavior or self-report measures. Performance-contingent rewards did not show any effect on free-choice behavior but did show enhancement on attitude measures. Based on their results, Cameron and Pierce concluded that reward systems were an appropriate motivational strategy in educational settings, and called for "abandoning cognitive evaluation theory" (p. 396). Eisenberger and Cameron (1996) did another meta-analysis in which they revised some categories. They did not find any overall effect of reward on free-choice behavior but a significant enhancement effect on attitudes. Likewise, they reported no effect for quality-dependent rewards (essentially performance-contingent rewards) on behavior but significant enhancement on attitudes. Based on their results, the researchers argued that the undermining effect was largely a myth. There was considerable criticism of the

methodology used in the Cameron/Pierce/Eisenberger meta-analyses and resistance to their conclusions. Finally, Deci et al. (1999) reported a meta-analysis of 128 studies seemingly intended to put the matter to rest. This was the only meta-analysis to include doctoral dissertations.

In general, there seems to be agreement among the results of Rummel & Feinberg (1988), Wiersma, (1992), Tang & Hall, (1995), and Deci et al (1999) that task-contingent tangible rewards (i.e. rewards received for either engagement in or completion of a task) *decrease* intrinsic motivation. Only Eisenberger and Cameron (1996) and Cameron and Pierce (1994) (using a similar group of studies) came to different conclusions. Other findings relevant to the present research were that the undermining (overjustification) effect was considerably stronger for free-choice behavior than for self-reports and that the undermining effect seemed to be stronger for young children than for college students. (Deci et al 1999)

Most recently, Lepper & Henderlong (2000) reviewed the reward literature and concluded that intrinsic and extrinsic motivation *can* (italics mine) conflict but that this need not necessarily be the case. They claimed that more recent research shows that intrinsic and extrinsic motivation can also work independently or together.

It has been suggested that extrinsic motivation can have effects on performance quality. (Wiersma, 1992). Several studies have shown that extrinsic reward can also affect mental processes such as creativity and cognitive flexibility (see Deci, 1992, for a review). Among them, Amabile, Hennessey and Grossman (1986) found that the artistic work of rewarded students was less creative than that of students who did not anticipate any reward. McGraw and McCullers (1979) reported that students expecting money as a reward for problem solving had more difficulty changing their mental set in order to solve other problems as compared to students who did not expect a reward.

Ecological Validity

In all of the debate about the effects of various types of reward on intrinsic motivation and the conflicting inferences made regarding application to academic-learning situations (Deci

et al, 1999a; Eisenberger, Pierce & Cameron, 1999; Lepper, Henderlong, and Gingras, 1999; Deci, Koestner & Ryan, 1999b) there has been very little discussion of the ecological validity of the experiments, particularly with respect to college students.

Typical Tasks.

While some studies of younger children used school-related tasks, Tang and Hall (1995) did not find any studies of college students that used academic tasks such as reading a text or listening to a lecture. Experiments with college students used tasks which appeared very unlike academic tasks. Puzzles were frequently used (e.g. Calder & Staw, 1975; Daniel & Esser, 1980; Porac & Meindl, 1982). Other tasks included pinball games (Harackiewicz, J. M., Manderlink, G., & Sansone, C., 1984), anagrams (Weiner, 1980), computer games such as "Frogger" vs. "Slot Machine" (Hitt, Marriott, & Esser, 1992), creating collages expressing the theme of "silliness" (Amabile, Hennessey, & Grossman, 1986), discriminating between cartoons (Eisenberger, Rhoades, & Cameron, 1999), and guessing coin-flipping outcomes (Kruglanski, Amitai, Margolin, Shabtai, & Zaksh, 1975).

Self-report Measures.

The self-report measures of interest tended to be brief and possibly unreliable. Deci et al (1999) referred to the self-report measure in their meta-analysis as "self reported interest/enjoyment" (p. 644). As operationalized, entertainment seemed to be a frequent component. For example, "How would you rate the game you played on entertainment value?" was one of three questions used for an interest measure." (Hitt, Marriott, & Esser, 1992, p. 410) "How much did you enjoy reading the passage?" (Grolnick & Ryan, 1987). This contrasts with Schiefele (1998) whose conception of topic interest considers the dimension of value to be as important as well as positive feelings about the task. His measure also asks whether or not the task is perceived as worthwhile, useful, etc.

Typical Rewards.

The tangible rewards offered to college students in research studies were not comparable to rewards found in academic settings, either in type or importance (Tang & Hall, 1995).

Whereas younger students received rewards that were commonly appealing to children (e.g., toys, candy, "good player" certificates), college students typically received small sums of money ($.25 per puzzle to $3.00 for target task) or movie passes. These might have been regarded as trivial by the participants in comparison to the importance of good grades, for example.

Other Rewards.

Typically the college students participated in order to earn partial course credit. Thus, even the control group might be constrained by extrinsic motivation, so that the college experiments really compared groups operating under different degrees of extrinsic motivation. The partial course credit would probably be considered a task noncontingent reward that has no effect, but Deci et al (1999) conceded that students may well feel an obligation to at least engage the task. These issues raise the question of whether it is possible to apply the results of past research to academic tasks that are related to goals of great importance to the students' future lives.

Purpose of the Current Study

To summarize, the present study draws upon three distinct areas of research. One area deals with the effect of topic interest on text learning. Previous research has suggested that participants who are interested in a text will engage in a deeper level of processing than the participants who are not.

A second area of research deals with ways of measuring cognitive structures. Unlike previous research, the present study will use two theory-based measures for assessing the reader's mental representation of a text.

Yet a third line of research deals with the effect of extrinsic motivation on intrinsic motivation. Previous research has shown that if participants are interested in a task, an extrinsic, task-contingent reward will undermine intrinsic motivation. However, especially for college students, the activities used to elicit intrinsic motivation have generally been game-like, undemanding and very dissimilar to academic tasks. The present study is the first to compare the

effects of a performance-contingent reward condition with a noncontingent reward condition on the personal (topic) interest of college students in an academic type of reading task.

As previously noted, a number of studies have reported effects of high levels of topic interest on cognitive processes and potential mediating variables such as aspects of the learning experience (arousal, attention, effort) and various learning strategies. This study examined the effects of various combinations of interest/reward conditions on these variables.

An effort was made to use tasks and rewards that might have similar significance to what exists in real-life academic settings. Rather than playing enjoyable games, participants read text passages from college-level introductory textbooks. Instead of small monetary rewards, the participants were told that the top 20% would receive from $25 to $150.

Thus, the purpose of the present research is 1) to advance understanding of the effects of personal interest on multidimensional criteria of text learning, 2) to examine the effects of different motivational conditions (intrinsic vs. extrinsic) on these criteria of text learning, and 3) to examine the hypothesis that, under certain circumstances, extrinsic reward will undermine personal interest (intrinsic motivation). This seems to be a worthwhile undertaking because 1) much previous research on the effects of personal interest on text learning contains problems which, hopefully, can be addressed in this research, (Schiefele, 1999), 2) personal interest and extrinsic reward have not been pitted against each other in the same study, and 3) studies of the effects of extrinsic reward on intrinsic motivation in college students have not used ecologically valid tasks.

METHOD

Participants

The participants in the main study were 163 students recruited from introductory psychology courses at a southern university. There were 114 female participants and 49 male participants, average age 19.4 years. Participation in experiments was a course requirement. Participants in preliminary studies were also recruited from introductory psychology courses.

Measures

Topic Interest

Interest was measured by the Topic Interest Scale (TIS) developed by Schiefele (1990, 1991, 1996). It consisted of 8 adjectives, each rated on a scale from 0 to 7. The 4-item Feeling subscale contained adjectives referring to feelings related to the topic such as "bored", "interested" and the Value subscale contained 4 items referring to the personal significance of the topic, including "useful" and "meaningful." The scale was intended to be used as a unitary scale. This version of the scale was adapted from U. Schiefele (personal communication, December 2, 2002). The scale was reported to be highly reliable in previous studies (Schiefele, 1990, 1991, 1996). Cronbach's alpha for the current study was .88. The Topic Interest Scale was administered twice: once after participants read a brief topic summary and again after they read the text passage.

Text Comprehension Test

A measure of Text Comprehension was constructed based on the concept of levels of representation proposed by van Dijk and Kintsch (1983) and implemented by Schiefele (1990,1996; Schiefele & Krapp, 1996) according to specific guidelines developed by U. Schiefele (personal communications, 2003). The test includes four types of sentences. Original (O-sentences) are taken verbatim from the text. Paraphrased (P-sentences) are constructed by

changing the wording of another set of sentences. Inference (I-sentences) are plausible inferences from the text, not actually stated within it, but presumably identifiable as correct if the reader has grasped the situation model. False (F-sentences) are inferences that directly contradict the situation model of the text.

The TCT measures the strength of three levels of text representation. For the first two levels, participants are asked to identify all the sentences that are original (i.e. taken verbatim from the text). The most shallow level of text representation is verbatim (VERB). This is the "linguistic surface representation of the text" (Kintsch, 1986, p. 88). The strength of verbatim representation is measured by the proportion of correctly recognized original sentences ("hit" rate) minus the proportion of incorrectly recognized paraphrased sentences ("false alarm rate"). The second level of representation is propositional (PROP). Ideas, or propositions, are represented; that is, the meaning rather than the exact language. The strength of the propositional representation is determined by the difference between the proportion of paraphrased sentences that are incorrectly recognized and the proportion of incorrectly recognized inference sentences. (Note that both rates involve incorrect recognition ("false alarm rates"). The underlying assumption is that the stronger the propositional representation, the more likely the reader is to mistake the paraphrased sentence for an original sentence. The fact that the reader "recognizes" the paraphrased sentence is presumed to indicate that he or she has a mental representation for the meaning although not for the exact language. The situational representation (SIT) is considered to be the deepest level of representation. It refers to the framework that is created in the mind of the reader. The situational representation refers to the situation described in the text. The organizational structure of the text combines with the reader's prior knowledge to create the situational representation. It is measured by the difference between the proportion of correct verification (identifying as "true") of inference sentences and the incorrect verification (identifying as "true") of false sentences. To construct the TCT, it was necessary to conduct a series of preliminary studies.

Preliminary Study I: Choosing the Topics

Introductory textbooks were surveyed for appropriate text passages. Several criteria were used. For example, texts with many graphics (charts, tables, maps, etc.), technical language, or statistics were not suitable. Level of difficulty was an issue. To be ecologically valid, the material should be approximately the same level of difficulty as the average college text. Readability of several college texts was examined, and it was discovered that readability scores varied widely. Eight text passages were selected that seemed to present the correct degree of challenge. They were of appropriate length and could stand alone.

In Preliminary Study I, 60 introductory psychology students were asked to read 8 brief summaries of the topic of the text passage, one at a time, and then to rate the topic on the Topic Interest Scale.

Preliminary Study II: Choosing the Text Passages

Based on the results of Study I, four passages were selected using several criteria: sufficiently high scores on the Topic Interest Scale, variability, and level of reading difficulty. The goal was to end up with a pair of text passages that were of contrasting topics but equivalent level of difficulty (as judged by Flesch Reading Ease Score) (Johnson, K., 1998). Eighty-one participants were randomly assigned two of four passages. They read the summary and rated their interest on the Topic Interest Scale, and then read the text and rated their interest again on a second TIS. The idea was to make sure that the participants' interest was not radically changed by some aspect of the text. The correlation between the pre-summary Topic Interest Scale I and the post-reading TIS II was calculated. The two text passages that were chosen--Biological Conservation and Medical Anthropology—had contrasting topics that might interest different portions of the population. They were of equivalent length and reading difficulty. Biological Conservation was 2045 words long and had a Flesch Reading Ease score of 34.2. Medical Anthropology was 2011 words long and had a Flesch Reading Ease score of 31.3. These readability scores are considered challenging for the average reader, but were typical of

introductory textbooks. The passages were organized in such a way that they could also be used to construct the Ordered Tree Task (see Appendix L for text passages).

Preliminary Study III: Recognition Sentences

Approximately 10 original (verbatim) sentences, 20 paraphrased sentences, and 10 inference sentences were constructed based on each text passage. Sixty-one participants were randomly assigned to read one of the passages and then indicated whether or not each of the 40 sentences was an original sentence taken verbatim from the text passage by answering "yes" or "no." This was termed a recognition test.

Preliminary Study IV: Verification Sentences

Sixty-seven participants were asked to read a randomly assigned text passage and indicate whether each of the sentences following was "true" or "false". The "true" sentences were plausible inferences from the text (but not actually stated as a proposition in the text) and the "false" sentences were statements that contradicted information in the text. This was termed a verification test. At the same time, additional paraphrased and inference sentences were tested for recognition because the initial testing for recognition sentences (Preliminary Study III) had not yielded enough useable sentences.

The final selection of sentences for the TCT was based on recognition and verification rates recommended by U. Schiefele (personal communication, 2004a). For example, the measure for verbatim representations (VERB) is original minus paraphrased sentences. The recognition rate for original sentences should be a reasonable percentage higher than the recognition rate for the paraphrased sentences used for the VERB measures, but not so high that there would not be enough variability. The same logic applies to the other two measures. The recognition or verification rate for the first sentence should be higher than that for the second sentence in the measure.

In addition to using recognition and verification rates as criteria for selecting sentences, two separation indices were recommended by Schiefele (personal communication, 2004b). These were used to choose the sentences that best differentiated between the highest scores and the

lowest scores on each measure of level of representation (i.e. VERB, PROP, SIT). The final TCT consisted of 42 items: 7 original sentences, 7 paraphrased sentences belonging to the VERB measure, 7 paraphrased sentences belonging to the PROP measure, 7 inference sentences belonging to the PROP measure, 7 inference sentences belonging to the SIT measure, and 7 false sentences belonging to the SIT measure.

Ordered Tree Technique

The Ordered Tree Technique (Task) (OTT) was developed to represent the structure of students' understanding of the subject matter of a course (Naveh-Benjamin, McKeachie, Lin, and Tucker, 1986). It is based on the premise that people usually remember all of those ideas that are connected to each other through associative links before trying to remember the next cluster of ideas that are linked to one another. The OTT consists of four trials separated by other cognitive tasks that function as distracters, intended to inhibit the participant's memory of the previous order of recall (Naveh-Benjamin & Lin, 1991). For each trial, the participants are asked to organize 16 terms taken from the text passage they have read. The OTT is based on a theory of mental organization that states that single concepts or sets of concepts are organized in a hierarchical structure. Three measures can be derived from the OTT that are used to compare different cognitive structures.

First, the *amount of organization* is measured by possible recall order (PRO). If a person listed words randomly during each trial, the number of possible recall orders would be very great. The number of words appearing contiguously on successive trials defines the measure. Words repeatedly appearing together are considered to represent chunks. In general, the PRO is inversely proportional to the amount of organization; the lower the score, the larger the number of chunks and the greater the amount of organization.

Second, the OTT can provide information about the *hierarchical depth* of a cognitive structure. This refers to the extent to which lower order concepts are associated with higher order, more general concepts. The score can be said to describe chunks within chunks, a measure of vertical organization. Third, the OTT can be used to determine the *similarity* between

cognitive structures. The score represents the number of chunks that one reader has in common with another. Such a measure allows the comparison of a novice's cognitive structure with that of an expert (Naveh-Benjamin et al., 1986). The experts used in this study were faculty members who specialized in the areas covered by the two text passages. They responded to exactly the same experimental materials as presented to the student participants.

The three OTT scores were calculated by a computer science graduate student (who has since received his M.S. in Artificial Intelligence). In part, he used a software program, TIGER, written in FORTRAN language by Henry S. Rueter (1980) and obtained from W.J. McKeachie (personal communication, 2003) He also wrote new software to calculate other scores when the TIGER program proved inadequate, and he wrote an original program as a course project which generated diagrams portraying the cognitive structure of individual participants.

Intervening Tasks

In the search for variables mediating between topic interest and cognitive outcomes (depth of processing), Schiefele and Krapp (l996) examined a number of process variables including elaboration, attention and arousal. They found that while topic interest correlated with elaborations, arousal, intensity of attention, and note- taking, none of the process variables proved to have a mediating effect. They concluded that "the included process variables are just epiphenomena of interest and do not have a causal role in learning from text." (p.9) Measures of some of these variables were included in this study as distracter tasks between trials of the Ordered Tree Task. Such measures would seem relevant and plausible to the participants (as opposed to reading or listening to unrelated material) and would not involve asking participants to encode additional new information about a different topic, which could disrupt any cognitive organization achieved from reading the initial text passage. Further, it would be interesting to examine the effect of extrinsic motivation on these variables.

Learning Strategies Questionnaire

The learning strategies questionnaire is a 14-item questionnaire assessing the use of various learning strategies on a scale from 1 to 9. Items measuring Elaborations were taken from

the questionnaire used by Schiefele and Krapp (1996) which in turn was based on the Motivated Strategies for Learning Questionnaire (MSLQ, Part B) (Pintrich, Smith, Garcia, & McKeachie, 1993; Pintrich, Smith, Garcia & Mckeachie, 1991). .

Two items were added to broaden the range of potential learning strategies to include chunking and rehearsal. Two items assessing Concentration were adapted from Schiefele (1992): "I felt completely caught up in the text passage I was reading" and Schiefele (1996) "When reading the text, I felt I was really concentrating". Another question was directed at assessing perceived effort.

Activation

Level of arousal was measured by the short form of Thayer's (1985, 1986, 1989) "Activation Deactivation Adjective Check List" (AD ACL). The AD ACL has two core dimensions: energetic arousal and tension. Each dimension was represented by 5 adjectives rated as to how well each adjective described the person's feelings *at this moment* on a scale from 1(not at all) to 5 (extremely). According to Thayer (1986), the test has been extensively validated and the two dimensions replicated many times.

Motivational Orientation

In addition to the short term state of being either intrinsically motivated (out of personal interest) or extrinsically motivated (seeking an external reward), it has been considered useful to think of long-term, trait motivational orientations as being either intrinsic or extrinsic. Nine items that were judged appropriate were taken from the MSLQ, Part A. Motivation (Pintrich et al, 1991, 1993), four ostensibly reflecting extrinsic motivation and five intrinsic motivation. Participants were asked to rate themselves on a scale from 1 (not at all true of me) to 7(very true of me). The scale was entitled "My Reasons for Studying".

Reasons for Participation

After completing the fourth Ordered Tree trial, participants were asked six questions relating to why they stayed to complete the experiment. The questions were directed at exploring the actual effects of the experimental manipulation as opposed to the intended effects.

Sustained Interest

Finally, two questions were asked to assess how the participants' interest survived the experiment. (1) "Would you be interested in learning more about (topic of the text passage)?" (2) "Would you be willing to participate in another study similar to this one even if you would not receive reward or credit for participation?"

Reading Times

At several places in the experimental materials, participants were asked to record the time. Three scores were derived: (1) time spent reading the text, (2) time spent on the text comprehension test, and (3) total time spent on the experimental tasks. Since all that the participants were asked to do was to look at the clock and record the time, it is likely that these are objective measures, not much influenced by issues of self-presentation and social desirability.

Control Variables

Verbal Ability

Previous studies have reported correlations between verbal ability/intelligence and levels of text representation (Schiefele, 1996, 1999). Participants gave written permission for the experimenter to obtain their Verbal and Total SAT scores from the university.

Prior Knowledge

Previous research has reported significant relationships between prior knowledge and levels of representation under some circumstances but not others. Effects of prior knowledge are not expected when the texts are below the reader's level of ability.

There is evidence that prior knowledge has an effect only when comparing groups that have large differences in knowledge about the subject, such as novices and experts (Vidal-Abarca, Sanjose, and Solaz, 1992).It was not considered feasible to use an objective prior knowledge test because the experimental agenda was overloaded as it was. A brief measure of perceived prior knowledge was constructed by combining the responses to two questions about familiarity with topic and amount of outside reading plus an arbitrary score for having taken a relevant course or taking it at the time of the experiment. Even though easy tasks might

minimize the influence of prior knowledge as well as verbal ability, to be ecologically valid reading difficulty should be at college level. Further, it is reported that motivation exerts more influence on comprehension when reading material is difficult rather than easy (Johnson, 1998).

Procedure

The experimental trials were conducted by two senior psychology students, both women. They alternated experimental conditions and rooms. Participants were randomly assigned to either the Contingent condition or the Noncontingent condition (by means of cards bearing the numbers of two different rooms) and then randomly assigned a manila envelope that contained test materials relating to one of the two text passages.

In the Contingent condition, participants filled out the consent forms, read the Topic Summary and filled out the Topic Interest Scale. After completing the TIS I, they were told in detail about the prize money, that they could win up to $150 based on the quality of performance on the Text Comprehension Test. The monetary awards were printed in their instruction booklet so they could follow along as the experimenter read them aloud. Neither group was told about taking a test until after they filled out the first TIS. It should be noted that this was an *offer* of a performance-contingent reward. The participants were informed that "the money will be mailed to the participants with the highest scores after *all* the tests are scored." Thus, the feedback aspect of the reward was eliminated and with it, the competence affirming aspect. In many previous studies it was possible for participants to judge their own performance to some extent, for example, how many puzzles completed, etc. Thus, it could be argued that these judgments could function as informational feedback. In this experiment, it was highly unlikely that participants could evaluate their own performance on the Text Comprehension Test.

In the Noncontingent condition, participants filled out consent forms. Then, after a slight delay, a confederate entered the room carrying test packets and appeared to confer with the experimenter. The experimenter then announced:

> We have a problem. We were going to do the first part of the experiment here and the second part in the computer lab. However, there has been an unexpected problem with the

> computer software, so we can't carry out the experiment as planned. Since you came for the experiment, you will receive credit anyway. However, we would really appreciate it if you would stay to help us with a similar study that can be done with pencil-and-paper only.

The experimenter then waited for a moment for those who did not want to participate to leave. Then the text envelopes were distributed. Participants proceeded with opening the test packet, reading the summary, and filling out the Topic Interest Scale I. Only one person took her credit and left. Seventy-eight students stayed after they had been told they could have their credit and leave. *Aft*er completing the first Topic Interest Scale, *both* groups of participants were told:

> We would like you to read and evaluate a passage from a textbook. You will be asked to answer some questions and take a test afterwards to help us evaluate the text.

Both groups were given the same instructions in order to make it possible to examine the effect of the different reward conditions separate from the effect of instructions and reasons given for the task (See Sansone & Smith,, 2000, for discussion of effects of reasons given for a task.) Schiefele (1999) discussed the effects of instructions on the personal interest-learning relationship. Of 22 studies reviewed, only 7 reported the instructions that were used. In these studies, participants were told either to learn the text as well as possible or to expect a learning test after reading. Schiefele suggested that these instructions probably brought about an extrinsic motivational orientation. However, despite the learning instructions, these studies showed significant interest-learning relationships. The same was true for the situational interest studies that reported instructions; the positive relationship between interest and learning was apparently not affected. In this study everything that was told to the participants was also printed in the test materials they were given (See Appendix L for complete scripts).

RESULTS

Descriptive Statistics

There was no significant difference in overall topic interest between the two text passages. The Topic Interest Scale I mean for Biological Conservation (N=82) was 4.00 (SD 1.33) and for Medical Anthropology (N=81) it was 3.79 (SD 1.37). In their meta-analysis, Deci et al (1999) defined tasks as "interesting" if their mean interest ratings were at or above the midpoint of the scale being used. The midpoint of the TIS is 3.5. Technically, then both text passages were expected to be interesting in terms of this criterion. There were no significant gender differences in topic interest. (Statistics for the Topic Interest Scale II will be discussed later.)

High Interest vs. Low Interest Groups: Splitting the Distribution

High Interest and Low Interest groups were created to enable comparison with previous results (Schiefele, 1990, 1991, 1992). The variable INTEREST1 was constructed by splitting the topic interest distributions of the two experimental conditions (Contingent and Noncontingent) for each text at the value that would achieve the best balance of cases. (BC High Interest = >4.00; Low Interest = 4.00 & <4.00. MA High Interest = 4.00 & >4.00; Low Interest = <4.00.) The High Interest group mean ratings were above the threshold set by Deci et al (1999), and the Low Interest mean ratings were below it for both text passages (p=. 000 for all differences.) (See Table AI.)

Contingent vs. Noncontingent Conditions: An unexpected finding

Before learning about the possibility of earning bonus money by good performance, the Biological Conservation Contingent group reported significantly more Topic Interest than the Noncontingent group for both subscales and total mean (p=. 002) and the Medical Anthropology Contingent group reported near-significant Feeling-related Scale Interest greater than the

Noncontingent group (p=. 053). Combining all cases, the Contingent group reported significantly more Topic Interest (p=. 002). (See Table AII)

There are two possibilities (if this is not a chance finding): either the Contingent group's interest was increased or the Noncontingent group's interest was decreased by some aspect of the experimental situation. It seems unlikely that the Contingent group's interest was increased before they found out about the possibility of a money reward. First, the Contingent group's reported topic interest was in line with preliminary studies, whereas the Noncontingent group's interest was substantially lower than the mean topic interest reported in two previous studies using the same texts. Second, for the Contingent group, the experimental situation was similar in its initial aspects to most, if not all, other experiments experienced by the students. It is difficult to find something in the initial phase of this experimental condition that would increase the Contingent participants' interest. It seems more plausible to assume that receiving credit for participation is a normal part of the experimental situation and when this was removed for the Noncontingent group, (by awarding the credit before the task), their interest declined. Evidence against this hypothesis comes from the Deci et al (1999) meta-analysis report that task noncontingent reward (e.g. reward just for participation rather than engagement or completion) does not affect intrinsic motivation. Yet it does seem as if the Noncontingent experimental manipulation dampened the interest of the participants. This was an unexpected finding, contrary to the theoretical premise of cognitive evaluation theory that a reward must be contingent to affect interest (Deci et al, 1999). Likewise, if anything, attribution theory would predict that the Contingent group would have initially lower topic interest, that they would make the attribution that "I am doing this because I have to get credit" whereas the Noncontingent group would make the attribution "I am doing this because I choose to, I want to."

Effects of Reward on Interest

Hypothesis 1. The high extrinsic motivation condition will decrease the interest of the high topic interest participants but will increase the interest of the initially low topic interest participants. The low extrinsic motivation condition will have no effect on topic interest.

Change in Interest: Interest after reading summary minus Interest after reading text passage.

A second Topic Interest Scale (TIS 2) was administered *after* the Contingent participants learned about the bonus money and all participants read the text. The second TIS asked participants to indicate what they had felt while reading the text passage rather than how they would expect to feel, as in the first TIS. As Hidi (2001) points out, the first type of measure is an expectancy measure whereas the second one is retrospective, and each has weaknesses. In the first measure, the individual has a very limited view of the topic; in the second, the individual's topic interest can be confounded with other characteristics of the text passage that influence interest. (See Burnette, 1998, for review of text-based interest.) The second TIS could be seen as including situational or text-based interest, although undoubtedly much influenced by the earlier topic interest rating. Thus, it is somewhat more comparable to the task interest ratings used in the reward/intrinsic motivation research. To calculate the change in interest score, the original, continuous topic interest variable was used. There was a very high correlation between interest scores after reading the topic summary and after reading the text (Biological Conservation r=. 94 and Medical Anthropology r=. 96).

The interest ratings of participants declined significantly after they read the text passages (based on T-test for paired samples: Biological Conservation change = -.0996 and Medical Anthropology change = -.1118). There was no significant difference in the amount of decrease between the two text passages. There was no significant difference in the amount of decrease between the Contingent and Noncontingent participants who read Biological Conservation. If anything, the Medical Anthropology Noncontingent participants decreased significantly more than the Contingent condition participants (C= -.0207 vs NC= -.2076, p=.029). Thus, there was no support for the hypothesis that the prospect of a performance-contingent reward is more likely to decrease interest than the receipt of a noncontingent reward.

Effect of Reward on Change in Interest at Different Interest Levels

According to Deci et al (1999), CET applies to tasks perceived to be at least average or above in interest; i.e. rated at or above the midpoint of the scale. For this study, it was assumed that the same principle applies to *topic interest* as well; that it must be at least average or above to be affected by reward. Overall, the mean topic interest ratings for both text passages were above the midpoint of the scale. Nonetheless, looking at the High Interest and Low Interest groups separately may provide a more clear-cut test of the hypotheses.

High Interest group. If an offer of a performance-contingent reward decreased interest, it would be expected that, after learning about the performance-contingent reward, the High Interest/Contingent participants would decrease in interest more than the High Interest/Noncontingent participants. However, this did not occur. Actually, the High Interest/ Noncontingent group showed a greater post-reading decrease in interest than the High Interest/ Contingent group (NC mean change=-.2591 vs. C mean change -.1264), but the difference was not significant (p=.124). (See Appendix C for Table CI) Thus, the offer of a reward was not related to the decrease in interest of the High Interest participants.

Low Interest group. The Contingent group showed a minimal and slightly smaller decrease in interest (-.0006) compared to the Noncontingent group (-.0591). The difference in the amount of decrease between groups was not significant (p=.522) (See Table CII.) Thus, offer of a reward did not increase the interest of the low interest group.

Reward and Sustained Interest

At the end of the experiment participants were asked if they (1) would like to learn more about the topic and (2) would be willing to participate in a similar experiment without receiving any reward or credit. These questions have been frequently used to measure intrinsic motivation after experimental manipulations (Tang, 1994). The two questions were combined into a variable named Sustained Interest. Overall, the Contingent group maintained significantly greater interest to the end of the experiment. (See Table DI). Considering each question separately, participants in the Contingent condition reported greater interest in learning more about the topic at the end of

the experiment than did the Noncontingent group (C mean 4.04, NC mean 3.26, p=.008.) The Contingent group also reported near-significantly greater willingness to participate in a similar study without reward or credit (C mean 3.05, NC mean 2.51, p =.055). (See Table DI).

The questions discriminated between the initial High and Low topic interest groups. At the end of the experiment, the High Interest group was still interested to learn more about the topic (HI 4.45 vs. LI 2.90, p=.000) and more willing to participate in a similar study without reward or credit (HI 3.21 vs. LI 2.39, p=.003) (See Table DII.). Thus, the differences in interest reported at the beginning (after reading the topic summary) were maintained to the end of the experiment. If, in fact, the prospect of reward decreased high interest and/or increased low interest, this outcome would not be expected.

Overall, there was no evidence for the hypothesis that the prospect of a performance-contingent reward is more likely to decrease interest than the receipt of a noncontingent reward. One plausible explanation for decrease in interest after reading the text would be text-related: neither text is an "easy read." In preliminary study II, interest ratings for the texts also decreased after participants read them and no experimental manipulations were involved. However, the possibility that each group declined for a different reason cannot be ruled out. That is, perhaps the Contingent group decreased in interest because of the offer of reward and the Noncontingent group decreased because they were given a reward (credit) upfront and asked to stay voluntarily. One argument against the latter explanation is that a substantial decrease in topic interest by the Noncontingent participants apparently occurred *before* they read the text and a further significant decrease *after* they read the text, so it seems reasonable to argue that the experimental manipulation affected the pre-reading decline but did not affect the post-reading decline in interest scores.

Summary. Based on the fact that that there was an equivalent decline in interest after reading the text by both experimental groups, there was no support for the hypothesis that offer of a performance-contingent reward will decrease interest as compared to a noncontingent reward. The offer of a reward did not decrease the interest of the High Interest/Contingent group

as compared to the High Interest/Noncontingent group nor increase the interest of the Low Interest/Contingent group. The relative differences in interest reported on the Topic Interest scale at the beginning (after reading the topic summary) were maintained to the end of the experiment. Nonetheless, the results were not conclusive. It is still possible, though not likely, that the Contingent and Noncontingent groups decreased in interest for two different reasons.

Effects on Quality of Performance

Hypothesis 2. The reward conditions will affect quality of performance. For the participants with high interest, the high extrinsic motivation condition will lead to lower performance on the text comprehension test as compared to high interest participants in the low extrinsic motivation condition. For low interest participants, high extrinsic motivation will lead to better performance on the text comprehension test.

Levels of Representation: The Text Comprehension Test

Creation of d' values. As recommended by U. Schiefele (personal communication, 2004) the difference scores (e.g. proportion O-sentences correctly recognized ("hit rate") minus the proportion of P-sentences incorrectly recognized ("false alarm rate" = VERB) were converted into d' values**.** This was done according to the method recommended by Macmillan and Creelman (2005, pp.7-8). First, the proportions for each type of sentence were converted to z scores and then the second z score of each pair was subtracted from the first. This normalized the distributions of the difference scores, and yielded three levels of representation scores: verbatim (Original-Paraphrased), propositional (Paraphrased-Inference) and situational (Inference-False).

Reward, Interest, and Topic X Levels of Representation

Multiple ANOVAs were performed with three fixed factors, Reward, Interest, and Topic, for each of the three dependent variables, verbatim, propositional and situational text representations. (See Table I). The reason for choosing analysis of variance is that two of the independent variables were necessarily dichotomous (reward and topic) and the third had been transformed into a dichotomous variable in previous research (Schiefele, 1992; 1996).

Effects of Reward on Levels of Text Representation

ANOVAs using the INTEREST1 (pre-reading topic interest) variable indicated between-subjects effects of reward for verbatim and situational representations (See Table I). Overall, participants in the Contingent condition, offered an incentive for good performance, formed stronger verbatim and situational representations than did participants in the Noncontingent condition, who were given credit without being required to do the tasks and then asked to volunteer for another experiment. There were no interactions.

Because of the large pre-reading differences in interest (See Table AII), ANCOVAs were calculated for reward and topic x levels of representation, using Topic Interest 1 (continuous variable) as a covariate. Controlling for topic interest did not change results substantially. Between-subjects effects of REWARD on verbatim and situational representations remained significant. (See Table JI.)

To further test CET, comparisons were made among the subgroups. (See Appendix B for means and standard deviations of subgroups.) For the high interest participants, there were no significant differences in performance on the TCT between Contingent and Noncontingent groups.

Table I

Effects of REWARD, INTEREST1 and TOPIC on Levels of Representation

N=163

Between-Subjects Effects

Source Dependent Variable		**df**	**Mean Square**	**F**	**Sig.**
REWARD	Verbatim	1	4.402	5.552*	.020
	Propositional	1	.658	1.704	.194
	Situational	1	2.925	4.477*	.036
INTEREST1	Verbatim	1	4.120	5.196*	.024
	Propositional	1	.280	.724	.396
	Situational	1	2.454	3.755*	.054

TOPIC	Verbatim	1	.031	.039	.844
	Propositional	1	.416	1.077	.301
	Situational	1	6.370	9.749**	.002
REWARD*INTEREST1					
	Verbatim	1	.270	.340	.561
	Propositional	1	.131	.340	.561
	Situational	1	.000	.000	.998
REWARD*TOPIC					
	Verbatim	1	.002	.002	.963
	Propositional	1	.014	.037	.849
	Situational	1	.384	.588	.444
REWARD*TOPIC					
	Verbatim	1	.133	.168	.682
	Propositional	1	.019	.049	.825
	Situational	1	.089	.136	.713
REWARD*INTEREST1*TOPIC					
	Verbatim	1	.510	.643	.424
	Propositional	1	1.154	2.986	.086
	Situational	1	.405	.620	.432
Error					
	Verbatim	155	.793		
	Propositional	155	.386		
	Situational	155	.653		

Note: INTEREST1 - interest measured after reading topic summary.

For low interest participants, the hypothesis was that performance-contingent (high extrinsic motivation) condition would lead to higher performance on the cognitive tests as compared to the Noncontingent (low extrinsic motivation) condition. Although CET predicts no effect of reward on low interest participants (Deci et al, 1999), others have reported such effects (see Wiersma, 1992 meta-analysis). This hypothesis was partially supported. The Low Interest/Contingent group formed stronger verbatim representations than the Low Interest/Noncontingent group (p=.028) and showed a trend toward stronger situational representations (p=.134), suggesting that the extrinsic motivation elicited better cognitive performance though perhaps at a shallow level (See Table CII).

Effects of Topic Interest on Levels of Text Representation

Hypothesis 3a. Participants who are more interested in the text will perform in ways that indicate greater depth of processing, as indicated by scores on Schiefele's Text Comprehension Test. High interest participants will score higher on items measuring propositional and situational representations and lower on items measuring verbatim representations than the low interest participants.

Based on the initial topic interest scale, High Interest was associated with significantly stronger verbatim and situational representations (See Table I for ANOVAs.) High Interest participants who read the Biological Conservation text were more likely than Low Interest participants to form strong situational representations indicating the deepest level of processing. However, they *also* formed stronger representations at the shallowest level of processing (verbatim) and the expected difference in propositional representations did not occur. High interest participants who read the Medical Anthropology text also formed stronger verbatim representations. Topic interest did not affect the situational representations for Medical Anthropology. This may be due to the fact that it was relatively easy to form situational representations for Medical Anthropology and therefore interest did not play an important role.

Effects of Topic on Levels of Representation

Participants reading the Medical Anthropology text formed significantly stronger situational representations compared to those who read the Biological Conservation text. There were no significant differences in reading difficulty or rated interest. The difference in representation probably results from differences in the structure of the two texts. Medical Anthropology has a narrative embedded in the text, whereas Biological Conservation has a more list-like structure. While both structures are thought to facilitate comprehension and recall, it is plausible that embedded narrative is more conducive to constructing a situation model (Armbruster, B.B., 1984). There were no differences between texts for verbatim or propositional representations.

Summary. Based on ANOVAs using topic interest, reward and topic as fixed factors, the Contingent condition was associated with stronger verbatim and situational representations than the Noncontingent condition. ANCOVA using the continuous variable Topic Interest 1 as a

covariate did not change substantially the significance of the results. High Interest participants formed stronger verbatim and situational representations. Readers of the Medical Anthropology text formed stronger situational representations.

Interest-After-Reading and Quality of Performance

Effects of Reward, Interest-After-Reading, and Topic on Levels of Representation

In studies of effects of reward on intrinsic motivation, interest in the task has been measured by ratings made *after* performing the task. That is, situational or task interest was measured rather than personal interest. In the current study, participants rated their interest both *before* and *after* reading the text passage. The distribution of after-reading interest was split to create a High Interest group and a Low Interest group, using 3.5 and above to create the High Interest group, following Deci and colleagues' (1999) use of the midpoint of the scale and above to define high interest tasks. This is called the INTEREST2 variable.

The INTEREST2 variable is more like the task interest measures reported in the reward/intrinsic motivation research (Deci et al, 1999), where typically participants were asked after performing the activity how much they enjoyed it. This was used to perform multiple ANOVAs (See Table II).

Effects of Reward on Levels of Representation Using INTEREST2 Variable

Using INTEREST2 in the ANOVAs, the Contingent (reward) group was associated with significantly stronger verbatim representations, significantly weaker propositional representations, and significantly stronger situational representations. Conversely, the Noncontingent group had significantly weaker verbatim representations, significantly stronger propositional representations, and significantly weaker situational representations. This inverse relationship between verbatim and propositional representations produces the pattern found by Schiefele (1992, 1996) for high interest participants in previous studies. He interpreted this as reflecting a deeper level of

Table II

Effects of REWARD, INTEREST2* and TOPIC on Levels of Representation
N=157

Between-Subject Effects

Source Dependent Variable		**df**	**Mean Square**	**F**	**Sig.**
REWARD	Verbatim	1	3.764	5.063*	.026
	Propositional	1	1.544	4.230*	.041
	Situational	1	3.009	4.523*	.035
INTEREST2	Verbatim	1	8.009	10.773**	.001
	Propositional	1	5.031	13.783**	.000
	Situational	1	1.380	3.755	.152
TOPIC	Verbatim	1	.087	.117	.733
	Propositional	1	.436	1.193	.276
	Situational	1	5.346	8.037**	.005
REWARD*INTEREST2					
	Verbatim	1	1.032	1.388	.241
	Propositional	1	.200	.548	.460
	Situational	1	.196	.294	.588
REWARD*TOPIC					
	Verbatim	1	.010	.013	.908
	Propositional	1	.008	.021	.886
	Situational	1	.490	.737	.392
REWARD*TOPIC					
	Verbatim	1	1.560	2.099	.150
	Propositional	1	.309	.846	.359
	Situational	1	.661	.994	.320
REWARD*INTEREST2*TOPIC					
	Verbatim	1	.977	1.314	.254
	Propositional	1	.742	2.033	.156
	Situational	1	.063	.095	.759

Error				
Verbatim	149	.743		
Propositional	149	.365		
Situational	149	.665		

Note: INTEREST2 - interest measured after reading the text representations.

processing as compared to a pattern of strong verbatim and weak propositional representations. A tendency toward this pattern also was found using the first topic interest scale, but then there was no significant difference in propositional representation scores.

Six cases were excluded from the second analysis because of missing data for the second TIS. The first ANOVAs were then recalculated excluding these cases to see if sample differences accounted for the difference in the effects of Reward on Tables I and II. This exclusion only partially accounted for the difference in results.

ANCOVAs were calculated for reward and topic X levels of representation, using Topic Interest 2 (continuous variable) as a covariate. Between-subjects effects of reward on verbatim, propositional, and situational representations remained significant. (See Table JII.)
The pattern of stronger verbatim and weaker propositional representations associated with reward gives support to the studies that find that performance-contingent reward impairs the quality of performance (McGraw & McCullers, 1979; Wiersma, 1992), in this case presumably by encouraging a more superficial level of processing, representing words rather than meaning. On the other hand, the Contingent group had stronger situational representations, which theoretically indicates greater depth of processing. Thus, the results are conflicting.

To further test CET, comparisons were made among the INTEREST2 subgroups. (See Table BII for means and standard deviations of subgroups.) The High Interest/Noncontingent group had significantly stronger propositional representations than the High Interest/Contingent group ($p=.032$). Comparing the low interest groups, participants offered a reward had significantly higher verbatim representations ($p = .011$) and nearly significantly higher situational representations ($p= .055$). These results are similar to those obtained with the INTEREST1 variable. For low interest participants, extrinsic motivation elicited better cognitive performance

though perhaps at a shallow level (See Table CII.). For high interest participants, low extrinsic motivation (Noncontingent condition) was associated with stronger propositional representations, which theoretically indicate greater depth of processing.

Effect of Interest-After-Reading on Levels of Text Representation

Using INTEREST2 as a fixed factor, High Interest participants had significantly stronger verbatim and propositional representations, but there were no significant differences in situational representation (See Table II for ANOVAs). The interest effects differed from those reported by Schiefele (1992, 1996) where High Interest participants had weaker verbatim representations and stronger propositional representations. There was no relationship between interest and situational representations. Thus, the hypothesis that topic interest would result in weaker verbatim/stronger propositional representations was not supported.

However, more recently Naceur and Schiefele (2005) reported an array of different results. In only one of four texts did they report finding high topic interest correlated with weak verbatim representations and strong situational representations. In general, the interindividual correlations between interest and other predictor variables and the three types of text representation were "not very predictable" (Naceur & Schiefele, 2005, p. 157). Perhaps measuring topic interest with a single-item rating contributed to the problem or the difficulty was with the levels of representation measure.

The prediction that High Interest participants will have weaker verbatim representations and stronger propositional representations (indicating deeper levels of processing) is based on the hypothesis that there is incompatibility between forming strong verbatim (shallow) and strong propositional (deeper) representations. The reason given is that focusing on strong propositional representations will suppress verbatim representations.

Naceur and Schiefele (2005) also explain the prediction that interested readers will form stronger situational representations. They suggest that "a positive relation between interest and the situational representation is to be expected because interest should motivate students to

elaborate new information, think about this information more deeply, and, therefore, build up a strong situational understanding"(p. 158).

In the current study (as well as previous studies-Schiefele, 1999) Verbal SAT was positively correlated with *both v*erbatim and situational representations, which indicates that those with greater verbal ability tended to form both strong verbatim *and* strong situational representations. Further, verbatim and situational representations were positively correlated for both texts (MA r=.40,p=<001; BC r=.36, p=<.01). For the Medical Anthropology text, verbatim, propositional, and situational representations were all positively correlated (See Appendix F tables). This argues against the interpretation that strong verbatim representations necessarily imply weak propositional representations. The current findings contrast with Naceur and Schiefele's (2005) report of a strong negative correlation between the verbatim and the propositional representations for three of four texts. Nevertheless, in the present study, the hypothesis predicting a negative (or nonsignificant) relationship between topic interest and verbatim representations together with a positive relationship with propositional representations was not supported.

Summary. Based on ANOVAs using interest-after-reading as a fixed factor, the Contingent condition was associated with stronger verbatim representations, and weaker propositional representations than the Noncontingent condition. This pattern has been identified as indicating more shallow text processing than the reverse pattern (Schiefele, 1992, 1999). However, the Contingent condition was associated with significantly stronger situational representations, theoretically reflecting greater depth of text processing. Thus, the results both supported and negated the hypothesis of an undermining effect of reward on quality of performance as reflected in depth of processing. Interest-after-reading was associated with stronger verbatim and propositional representations. The effect of interest-after-reading on situational representations was not significant (p=.152).

Effects of Interest on Cognitive Structure

Hypothesis 3b. On the Ordered Tree Task, high interest participants will have cognitive structures that are more similar to the cognitive structure of the expert. Their cognitive structures will be more organized and have more depth.

For Medical Anthropology readers, topic interest and sustained interest (expressed at the end of the experiment) were correlated with similarity to the expert. (See Table III). Similarity to expert was correlated with strength of verbatim representation. In Naveh-Benjamin et al (1986) similarity to expert was regarded as a measure of student learning.

For Biological Conservation readers, interest-after-reading the text and sustained interest were correlated with amount of organization. All three interest variables were correlated with

Table III

Correlations Between Interest Variables and Ordered Tree Variables

Medical Anthropology N = 73			
	Amounts of Organization	Herarchical Depth	Similarity to Expert
Interest 1	-.092	.011	.316**
Interest 2	-.188	.009	.219
Sustained interest	-.138	.161	.332**
Correlations between levels of text representation and Ordered Tree variables			
Verbatim	-.310**	.132	.249*
Propositional	.048	-.057	.050
Situational	-.215	.164	.216
Biological Conservation N = 72			
	Amount of Organization	Hierarchical Depth	Similarity to Expert
Interest 1	-.222	.256*	-.026
Interest 2	-.262*	.239*	.049
Sustained interest	-.354**	.346**	.072
Correlations between levels of text representation and Ordered Tree variables			

Verbatim	-.290*	.327**	-.220
Propositional	-.001	.038	.005
Situational	-.223	.171	.051

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2=tailed)

hierarchical depth (See Table III). Thus, each of the above hypotheses was supported by responses to one of the text passages. For examples of diagrams ("trees") demonstrating various patterns of OTT scores see Appendix M.

For both text passages, strength of verbatim representations was correlated with amount of organization, and also with hierarchical depth only for Biological Conservation. This finding is consistent with the theory that chunking leads to improved recall of text. The amount of organization and hierarchical depth scores for both experts were substantially higher than the means of the student scores. (See Appendix Table GII). This suggests that these scores do measure an aspect of effective text processing.

Comparison of text passages

In an effort to explain the fact that interest variables correlated with similarity to the expert for the Medical Anthropology text and with the measures of organization and depth for the Biological Conservation text, the two text passages were compared through T-tests. The Medical Anthropology readers had better amount of organization scores, higher depth scores and showed more similarity to the expert than the Biological Conservation readers (See Table G II). As noted before, Medical Anthropology readers also developed stronger situational representations. Otherwise, there were almost no other significant differences between readers of the two texts. There were no significant differences in ability scores (verbal and total SAT), interest scores, reading times, learning strategies, activation, etc. Biological Conservation readers did report significantly more prior knowledge. It may be that they approached the text with a different knowledge structure that clashed with that of the expert and/or the author of the text. On the other hand, differences in text structure may account for the differing results. Superficial

examination of the two texts shows that Medical Anthropology was written in a more narrative style while Biological Conservation presented factual material in a more hierarchical, list-like form, with fewer concrete examples.

Learning Strategies

Hypothesis 4. Different types of motivation (extrinsic vs. intrinsic) will be associated with different learning strategies. High intrinsic interest will lead to learning strategies that are more directed toward deep processing. Offer of reward for good performance will encourage strategies associated with shallow processing.

Effects of Reward and Interest on Learning Strategies

MANOVA shows the relationships between reward and interest and salient learning behaviors (See Table IV.) There were main effects for both REWARD (F=4.75, p=.003) and INTEREST (F=5.949, p=.001). There were between-subjects effects of REWARD on rehearsal (F=7.382, p=.007) and effects of INTEREST on elaboration F=11.151, p=.001) and effects on concentration of both REWARD (11.151, p=.001) and INTEREST (F=17.582, p=.000). There were no TOPIC effects. There were no interactions.

Thus, participants in the Contingent condition reported significantly more use of rehearsal and greater concentration than the Noncontingent condition, but differences in elaboration did not reach significance (p=.10) (See Table EI in Appendix E for additional learning strategy variables). By comparison, High Interest participants reported significantly more use of elaboration and greater concentration than the Low Interest participants. The differences in rehearsal did not reach significance (p=.10). Topic had no effect on the reported use of learning strategies.

The greater use of rehearsal reported by the Contingent group could be related to forming stronger verbatim representations. While there is no evidence for an effect of reward on self-reported interest, there is some evidence for an effect on learning behavior. The greater use of elaboration reported by the High Interest participants is consistent with previous studies (Schiefele, 1992).

Table IV

Effects of REWARD, INTEREST1 and TOPIC on Learning Strategies: Concentration, Rehearsal and Elaboration

N = 163

Multivariate Tests

Effect	F	df	Error df	Sig.
REWARD	4.754	3	153	.003
INTEREST 1	5.949	3	153	.001
TOPIC	.329	3	153	.804
REWARD*INTEREST1	1.319	3	153	.270
REWARD*TOPIC	.874	3	153	.456
INTEREST1*TOPIC	1.171	3	153	.323
REWARD*INTEREST1*TOPIC	.091	3	153	.965

Between-Subjects Effects

SourceDependent Variable		df	Mean Square	F	Sig.
REWARD	Concentration	1	23.256	11.151**	.001
	Rehearsal	1	22.767	7.382**	.007
	Elaboration	1	2.313	2.724	.101
INTEREST 1	Concentration	1	36.666	17.582**	.000
	Rehearsal	1	8.322	2.698	.102
	Elaboration	1	6.482	7.637	.006
TOPIC	Concentration	1	.231	.111	.740
	Rehearsal	1	.853	.276	.600
	Elaboration	1	.807	.951	.331
REWARD*INTEREST1					
	Concentration	1	1.988	.340	.561
	Rehearsal	1	.037	.340	.561
	Elaboration	1	.741	.000	.998
REWARD*TOPIC					
	Concentration	1	.359	.172	.682
	Rehearsal	1	.954	.309	.825
	Elaboration	1	.470	.553	.713

INTEREST1*TOPIC					
	Concentration	1	2.012	.965	.328
	Rehearsal	1	9.124	2.958	.087
	Elaboration	1	2.228	2.625	.107
REWARD*INTEREST1*TOPIC					
	Concentration	1	.001	.000	.982
	Rehearsal	1	.108	.035	.852
	Elaboration	1	.070	.083	.774
Error	Concentration	155	2.085		
	Rehearsal	155	3.084		
	Elaboration	155	.849		

Reading Time as a Learning Strategy

Reading Time Associated with Interest, Reward

At several places in the experimental materials, participants were asked to record the time. Three scores were derived: (1) time spent reading the text, (2) time spent on text comprehension test, and (3) total time spent on the experimental tasks. Since all the participants were asked to do was to look at the clock and record the time, it is likely that these are objective measures, not much influenced by issues of self-presentation/social desirability. Reading time can be viewed as a learning strategy.

Participants who reported greater topic interest *before* reading the text passage reported spending more time reading the text, more time on the text comprehension test, and more total time on the experiment (See Appendix I for table.) Similarly, greater interest *after* reading the text was correlated with more time spent reading the text, more time on the text comprehension test, and more total time on the experiment.

Participants in the Contingent condition spent more time reading the text, more time on the TCT, and more total time on the experimental tasks than did those in the Noncontingent condition. In short, both interest and reward resulted in participants spending more time reading the text, working on the text comprehension test, and completing the experimental tasks. From a common sense point of view this is not remarkable, but some previous studies have suggested

that interested readers actually spend less time reading because their interest enables them to assimilate the material more rapidly (Hidi, 2001). Present findings contradict this idea.

Reading Time and Text Representations

Verbatim representations were significantly correlated with text reading time and total reading time. Reporting rehearsal as a learning strategy was also correlated with text reading time, supporting the possibility that some of the extra text reading time was spent going over the exact wording of the text. Situational representations were significantly correlated with time spent on the test and total time (See Appendix I for table.) This supports the idea that perhaps participants could improve their situational representation scores by spending more time on the test, possibly forming representations while taking the test. None of the reading time scores was correlated with propositional representations.

Reading Time and the Ordered Tree Task

On the Medical Anthropology text, time spent reading the text, doing the text comprehension test, and completing all the experimental tasks were correlated with amount of organization on the OTT. Time spent reading the text was also correlated with similarity to the expert. For the Biological Conservation text, there were no significant correlations.

Reading Time and Concentration

Two items were intended to elicit perception of concentration. "While reading the text, I felt I was really concentrating" was significantly correlated with all three reading times (See Appendix I). Also, "I felt completely caught up in the text passage I was reading" was significantly correlated with all three reading times. Thus, spending more time on the tasks, especially the text passage and test, was correlated with perceiving oneself as concentrating. This supports the validity of this self-report measure.

Variables Not Related to Reading Time.

Differences in verbal ability were not correlated with time spent on the tasks. There were no significant correlations between verbal ability (verbal SAT) or overall academic ability (total SAT) and any of the three reading time scores. (See Appendix I.) Similarly, differences between

the two text passages were not correlated with time spent on reading, the text comprehension test, or the tasks as a whole. There were no correlations between topic and any of the three reading time scores. There were no significant correlations between prior knowledge and any of the reading times.

Summary. The Contingent group reported more use of rehearsal, which could be related to their forming stronger verbatim representations. The Contingent group also reported greater concentration than the Noncontingent group. While there is no evidence for an effect of reward on self-reported interest, there is evidence for an effect of reward on learning behavior. High Interest participants reported more use of elaboration and greater concentration. Both interest and reward were correlated with participants spending more time reading the text, working on the text comprehension test, and completing the experimental tasks.

Motivational Orientation

High interest was associated with reports of greater intrinsic ($p=.003$) as well as extrinsic motivational orientation ($p=.004$) as compared to the low interest participants. Intrinsic and extrinsic motivational orientations were significantly correlated ($r=.69$, $p=.000$). Students apparently did not consider these motivational orientations to be in opposition to each other. This contrasts with the findings of Lepper et al (2005) who found intrinsic and extrinsic motivational orientations in children to be essentially independent. However, this might be a result of the measure they used. In constructing the measures, Lepper et al, p. 187) found that concern about getting good grades ("I work really hard because I like to get good grades" and "I do extra projects so I can get better grades") correlated with both the extrinsic and intrinsic motivation scales (more highly with intrinsic), so they discarded both questions, basing the extrinsic motivation measure largely on preference for easy work and wanting to please the teacher.

Further, intrinsic and extrinsic motivational orientations were both correlated with elaborations, rehearsal, chunking, concentration, and sustained interest. (See Appendix H.) It might be inferred that students tend to think of motivational globally. One is either "motivated" or "unmotivated". To some extent, these results were supported by Lin and McKeachie (1999),

Table V

Correlations Between Various Predictors and Levels of Representation

All Cases N = 163					
	REWARD	Interest	Verbatim	Propositional	Situational
Verbal SAT (N=138)	-.081	.169*	.303**	.133	.334**
Energetic Arousal	-.022	.199*	.167*	.235**	.093
IntrinsicM	.063	.234**	.073	.090	-.029
ExtrinsicM	.070	.224**	.076	.069	-.065
Prior Knowledge	.046	.321**	.204**	.124	.004
Concentation	.198*	.482**	.375*	.248*	.230**
Rehearsal	.222*	.245*	.188*	.048	.059
Elaborations	.150	.346*	.206**	.180*	.134
Chunking	.059	.127	.148	.197*	.002
Effort	.141	.185*	.173*	.066	-.008

**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

who used the Intrinsic and Extrinsic Goal Orientation scales of the MSLQ to correlate motivational orientation with academic achievement (course grades). They found that college students with a medium level of extrinsic motivation were more likely to achieve high course grades, and students who reported high levels of intrinsic motivation along with medium extrinsic motivation did especially well.

Only extrinsic motivational orientation was correlated with energetic arousal and effort. Perhaps participants who had an intrinsic motivational orientation perceived the reading as less effortful. It has been suggested that interest is associated with *lessened* feeling of effort (Hidi, Renninger, & Krapp, 1992). Also, Lepper and Henderlong (2000) commented that as students get

older, they become more and more reluctant to admit to effort, believing that having to exert effort is an indication of lack of innate ability.

All of the intercorrelations among interest, learning strategies, and motivational orientation might be considered just a social desirability or "good student" response set if it were not for the fact that self-reported interest and learning strategies were correlated with objective text representation measures (See Table V.) Rehearsal was correlated only with verbatim representations, which is appropriate as it is a learning strategy associated with more superficial learning. Similarly, effort was correlated only with more superficial learning (verbatim representations). Elaborations and chunking were correlated with propositional representations as would be expected for a deeper level of text processing. Concentration was correlated with all three types of text representation. Concentration is sometimes seen as part of the definition of interest as a psychological experience (Hidi, 2000), but it not considered that in the present study. However, the consistency with which concentration appears in relation to all three types of text representation lends support to the idea that concentration accompanies the experience of interest.

There were no significant correlations between motivational orientation and Verbal SAT or levels of text representation. There were no significant differences in motivational orientation between the Contingent and Noncontingent groups, nor would any be expected.

Control Variables

Prior Knowledge

Prior knowledge was correlated with Topic Interest Scale I ($r = .32$, $p < .000$). It was also correlated with verbatim scores for Biological Conservation ($r = .29$, $p < .01$). Perhaps participants who claimed greater prior knowledge found it easier to remember the language of the text because of its greater familiarity.

Participants claimed significantly greater prior knowledge of Biological Conservation than of Medical Anthropology (BC mean=6.84481 vs. MA mean 4.1266, p=.000). Males claimed greater prior knowledge than females (M mean = 6.3830 vs. F mean = 5.1081, p = .028).

Prior knowledge questions were very general and involved self-report. This may account for the fact that prior knowledge had only a minimal effect on the correlations between interest and levels of representation and on the relationships between reward and levels of representation (See Tables JIII & JIV.).

Verbal Ability

Only 138 Verbal SAT scores were available. There were 144 Total SAT scores, because some students submitted ACT scores that have SAT equivalents. The mean Verbal SAT was 603.77 and the mean total SAT was 1167.85. There was a considerable range, from 410 to 800 on the Verbal SAT and 820 to 1480 on the total SAT. The inability to obtain scores for all the participants raises the question of whether differences between zero-order correlations and partial correlations reflect differences between the total sample and the SAT sample. (See Appendix J for tables)

The High Interest participants had a significantly higher Verbal SAT than the Low Interest participants (HI mean 616.27 vs. LI mean 591.97, p. = .047). However, the total SAT scores were not significantly different (HI mean 1196.23 vs. LI 1180.13, p=.434) . Verbal SAT was correlated with verbatim representations (r=.30, p<.01) and situational representations (r=.33, p<.000). The correlation of Verbat SAT with situational representations provides some support for the validity of this measure of depth of processing.

The Noncontingent group had a nonsignificantly higher Verbal SAT. Controlling for Verbal SAT increased the correlations between reward and verbatim and situational levels of representation slightly (See Table JV in Appendix). Controlling for Verbal SAT decreased the correlations between topic interest before reading the text (TIS I) and levels of representation minimally (See Table JIII in Appendix). For interest after reading the text, controlling for Verbal SAT decreased only the interest-situational representation correlation, and that was still significant (p=.05).

Reasons for Participation

The questions about reasons for participation asked at the end of the experiment, were intended to get at the participants' perception of the experimental conditions. Noncontingent participants were significantly more likely to say they participated in the experiment because they "wanted to help the experimenter" (On the 7-point scale, NC mean = 5.60 vs. C mean = 4.13, p = .000) which suggests a greater need for justification. Both the Noncontingent and the Contingent group strongly agreed that they participated because it was "only fair because they were getting credit" (NC = 5.88 vs. C=5.69, ns). Perhaps participants in both conditions felt an obligation to participate that was perceived as controlling. The Noncontingent participants were also significantly more likely to rate "reward/credit" as important (NC= 5.37 vs. C=4.33, p=.001). Thus, apparently credit was an important issue with the Noncontingent group, even though they had been told they did not have to participate in the experiment to receive the credit. These answers suggest that different types of extrinsic motivation might be present despite the elimination of task-contingent reward. However, the extent of influence is not known. (See Appendix K for complete table.)

DISCUSSION

Effect of Reward on Intrinsic Motivation

There was little support for the hypothesis that offering college students a performance contingent reward will decrease their interest in an academic-type task. The participants who were offered a monetary reward did indicate decreased interest after they read the text passage; but the students who had already received course credit for the experiment not contingent on participation showed a similar decrease in interest. Interpretation of results was complicated by the fact that the Noncontingent reward participants initially reported a significantly lower level of topic interest than the Contingent reward participants. The explanation for this is unclear. The decreased interest *after* reading may be attributable to characteristics of the texts (possibly reading difficulty) or evaluation threat resulting from instructions regarding a test.

Evaluation threat is less likely as a factor. The test was presented to both groups as a means of helping evaluate the text. Only the Contingent group was offered a money reward for doing well. In addition, the general level of tension reported by all participants was very low (Tense Arousal C mean = 1.61 and NC mean = 1.74 on 7-point scale) and not significantly different between the experimental conditions. Of course, it is possible that the two groups decreased after reading the text for two different reasons, but that is difficult to demonstrate.

CET proposes that there are two opposing aspects of reward that affect intrinsic motivation: the controlling nature of reward and the informational nature. Positive feedback affirms competence and increases intrinsic motivation. In this study, the feedback element was eliminated. The effort was made to increase the control element in the Contingent condition by setting an explicit standard for receiving different amounts of reward. At the same time, an effort was made to decrease the control element for the Noncontingent group by making it explicit that they had a choice; they could have credit even without participating in the experiment, thus

increasing self-determination. The net result seemed to be that, contrary to prediction based on the literature, the task noncontingent reward may have had a more depressing effect on interest than did an offer of performance-contingent reward. In effect, it seems that the Contingent group's interest held up as well or better than that of the Noncontingent group, contrary to what CET would predict. A possible explanation comes from general interest theory (Eisenberger, Pierce & Cameron, 1999) which suggests that the effect of reward depends on how the reward is administered, either in ways that suggest the task is unimportant, thus decreasing interest, or with explicit standards that give the person a sense of self-determination (autonomy). Harackiewicz et al (1984) found that reward can enhance value. They proposed that a substantial reward makes the task seem worth accomplishing. Perhaps the opposite applies: giving credit in advance of participation reduces the perceived value of the task. It may be that an unearned reward is not perceived as a real reward. There is also the issue of equity. In rating their reasons for participation in the experiment, both the Contingent and Noncontingent groups gave the highest rating to "Since I was getting credit, I felt it was only fair to do all the tasks. (C mean=5.69and NC mean = 5.88 on a 7-point scale.) Thus, with respect to getting credit, the Noncontingent group seemed to feel as compelled to perform as the Contingent group even though they were told they could have it without further participation in the experiment.

However, the idea that perception of external constraints decreases interest in an activity cannot be entirely discounted. That may be the explanation for the apparent low interest in the Noncontingent condition. Possibly the Noncontingent participants felt controlled, manipulated into staying to complete the tasks as they said "in order to help the experimenter" or because the social norm attached to the course requirement led them to feel compelled to complete the tasks. Whereas perhaps the Contingent group was so used to the usual experimental situation where credit was given at the end of the task that it was not experienced as an external constraint but as a choice.

Another possible explanation of the failure to find results consistent with CET predictions is that personal (topic) interest is, by definition, more stable, more embedded in personality, and

less vulnerable to external influences, whereas past research on effects of reward on intrinsic motivation typically examined situational interest, using brief, entertaining tasks that provided transient experiences of satisfaction.

Effects of Interest and Reward on Quality of Performance

Depth of Text Processing

The effects of personal interest and reward appear to be independent. Personal interest is associated with stronger text representations, and the offer of an extrinsic reward also elicits stronger text representations.

This study does not replicate the finding that topic interest is associated with greater depth of cognitive processing as reflected in weak verbatim representations paired with strong propositional and/or situational representations. Both extrinsic (reward) and intrinsic (interest) motivation were associated with strong verbatim representations. This result may be best explained by the finding that interest and reward are both significantly correlated with time spent reading the text, and text reading time is correlated with strength of verbatim representations. Other researchers have attributed strong verbatim representation to reading time rather than seeing it as simply reflective of shallow processing. In one of their experiments looking at the relationship between reading goals and levels of representation, Schmalhofer and Glavanov (1986) attributed the strong verbatim representations to participants' spending more time reading material relevant to the test. Also similar to the current study, they reported a correlation between verbatim and situational representations. (See Appendix F for intercorrelations among sentence types.)

Further, in the current study reward is correlated with rehearsal. It seems plausible that reward encourages participants to rely more on rehearsal (leading to being able to recall exact wording) (See Table III). Apparently students believe that rehearsal is an effective learning strategy and when offered an incentive such as a substantial monetary reward for performance, rely more heavily on this strategy, and spend more time reading the material, thus leading to stronger verbatim representations. On the other hand, the finding that reward is correlated with

stronger situational representations, which theoretically reflects greater depth of processing, contradicts the hypothesis of a negative effect of reward on depth of processing. Possibly students offered a reward have more incentive to retrieve content from the text in order to answer the verification questions. If they also have better recall, perhaps the situation model can be constructed *after* reading the text passage.

The association of interest with rehearsal seems related to a different pattern of responses. When the interest correlations and the reward correlations are compared, other factors associated with these independent variables appear quite different. The difference seems to be that the participants who reported high interest presented a consistent picture of themselves as motivated students able to make use of many learning strategies, while the low interest participants presented a picture of lack of engagement. High interest was correlated with many predictor variables: energetic arousal, intrinsic motivation, extrinsic motivation, concentration, rehearsal, elaborations, effort, Verbal SAT, and reading times. On the other hand, reward was correlated with relatively few predictor variables: only rehearsal, concentration, and reading times. That is, apparently offering a reward did not turn the participants into model students but just got them to concentrate more and spend more time reading which apparently affected text processing—partly in a positive way (stronger situational representations) and partly in a supposedly negative way (weaker propositional representations/stronger verbatim representations).

However, there is a question as to whether the pattern of stronger verbatim representations/weaker propositional representations is necessarily negative or could be a result of the test construction. An unusual characteristic of the TCT is that sometimes "incorrect" answers are taken to indicate greater depth of processing. While the verbatim and situational measures involve subtracting a "false alarm rate" (incorrect responses) from a "hit rate (correct responses), the propositional measure involves subtracting one "false alarm rate" (set of incorrect responses) from another. Thus, mistakenly identifying a paraphrase as an original sentence is taken to show deeper processing; that the reader paid more attention to meaning than to the more superficial language. However, readers who have good verbatim recall may therefore make

fewer incorrect responses and have a low "false alarm rate". Thus, they may also have strong propositional representations that are not identified by this test.

Summary. Taken together, results indicate that the depth of text processing is affected by many variables, including interest, reward, text structure and verbal ability. Interest and reward appear to be independent variables. Interest is associated with reporting learning strategies that are presumed to encourage deep processing more than reward does. However, judging by strength of text representations, interest is not associated with greater depth of processing than is reward. Concentration and reading time seem to be the process variables that link both interest and reward to strength of representations.

Cognitive Structure (OTT)

The Ordered Tree Technique results provide some support for a relationship between interest and quality of cognitive structure. Biological Conservation readers displayed correlations between the measures of interest and amount of organization and hierarchical depth. Medical Anthropology readers displayed correlations between measures of interest and similarity to the expert. The explanation for this seems to lie in differences between the texts. Using T-tests to compare the two text passages revealed virtually no significant differences *except* for the cognitive structure variables: amount of organization and hierarchical depth, and similarity to expert (See Appendix G for Table G I). Medical Anthropology readers had higher organization scores, greater similarity to the expert, and stronger situational representations. That is, the Medical Anthropology text appeared to be more "chunkable", easier to form situational representations and presumably easier to learn from.

Future Directions

It would be useful to replicate the Contingent and Noncontingent experimental conditions, testing topic interest before and after both groups learned about the experimental conditions. In this study, the Noncontingent group was not given a topic interest questionnaire before being told about the problem with the experiment because it was thought that this would make the whole experimental manipulation less credible if participants were told that the original

experiment could not be performed and then were handed test materials for a supposedly "different" experiment that matched the topic summaries they had just read. A decrease in topic interest related to the noncontingent manipulation was not mentioned anywhere in the literature and was not anticipated by the experimenter. Splitting the experiment into two sessions, one for assessing topic interest only, and the second for the rest of the tasks, might help solve the problem, but at the risk of many participants not returning for the second session and biasing the sample. Further, one half of the participants would have to be given a text in which they had already indicated little interest (to form the low interest group) and this might add another variable to the mix.

The relationship between personal (topic) interest and situational or text-based interest deserves more investigation. Personal (topic) interest and situational interest in academic-type tasks seem to be closely related whereas it seems unlikely that there would be similar personal interest in the kinds of tasks used in classic research studies investigating the effects of extrinsic motivation, such as anagrams or puzzles. Research on the effects of reward on intrinsic motivation using college students has relied almost entirely on brief, entertaining tasks very unlike tasks facing students in college. It is not clear how this research applies to tasks that are perceived as more serious and related to the individual's future. More research is needed at the college level using appropriate academic tasks before CET can be applied to college students. What the current research contributes is that both interest and reward affect quality of performance but in different ways, and it is not clear which is "better". That is, it is not clear which pattern of text representations indicates greater depth of processing.

It may be that extrinsic motivation leads to learning strategies that produce shallower processing because of student misconceptions about the value of the strategy. Discussion of learning strategies in relation to reading goals and levels of representation might be helpful to students.

It would be interesting to further investigate the phenomenon of concentration. Investigation of physiological correlates of concentration could be useful. More understanding of the nature of "concentration" as a state of consciousness is needed.

The Ordered Tree Task seems to have possibilities for future research. It might be a good way of evaluating text passages for the extent to which they facilitate learning. Immediate steps to take would be to examine the extent of agreement among experts and to have writing experts describe the characteristics that separate the texts that receive high scores on the OTT from those that get low scores. For example, in this study, one text seemed to be more "learnable" even for the expert. One of the experts received higher amount of organization and depth scores than the other, and participants who read that text got higher mean scores on similarity to the expert.

Future research leads in many directions. It would be interesting to further explore the effects of noncontingent or unearned reward on interest and performance. Exploration of the Ordered Tree Technique for evaluating texts as well as measuring variables influencing cognitive structure would be a worthwhile endeavor. Further study of the Text Comprehension Test to understand the contradictory results found in this study would benefit future research.

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APPENDIX A

Table AI

Topic Interest Scale Means of High and Low Interest Groups

	INTEREST	N	Mean	Standard Deviation	Mean Difference	Sig. (2-tailed)
Biological Conservation						
Total scale	High Low	42 40	4.88 3.07	.595 .786	1.804***	.000
Feeling	High Low	42 40	4.15 2.23	.897 .858	1.918***	.000
Value	High Low	42 40	5.60 3.91	.895 1.057	1.689***	.000
Medical Anthropology						
Total scale	High Low	38 43	4.99 2.73	.836 .722	2.260***	.000
Feeling	High Low	38 43	4.47 2.52	1.269 .934	1.956***	.000
Value	High Low	38 43	5.50 2.94	.889 1.021	2.564***	.000
All Cases	Total scale	80 83	4.93 2.89	.716 .759	2.034***	.000
Feeling	High Low	80 83	4.30 2.38	1.095 .905	1.924***	.000
Value	High Low	80 83	5.55 3.40	.888 1.142	2.146***	.000

Table AII

Topic Interest Scale Means of Contingent and Noncontingent Groups

	REWARD	N	Mean	Std Deviation	Difference	Sig. (2-tailed)
Biological Conservation						
Topic Interest scale	Contingent Noncontingent	42 40	4.37 3.60	.991 1.149	.773**	.002
Feeling	Contingent Noncontingent	42 40	3.54 2.89	1.296 1.230	.673*	.018
Value	Contingent Noncontingent	42 40	5.20 4.32	1.070 1.362	.871*	.002
Medical Anthropology						
Topic Interest scale	Contingent Noncontingent	43 38	3.99 3.56	1.325 1.406	.436	.155
Feeling	Contingent Noncontingent	43 38	3.73 3.10	1.400 1.498	.634	.053
Value	Contingent Noncontingent	43 38	4.25 4.01	1.547 1.676	.237	.510
All Cases Topic Interest Scale	Contingent Noncontingent	85 78	4.18 3.58	1.181 1.273	.601**	.002
Feeling	Contingent Noncontingent	85 78	3.64 2.98	1.345 1.363	.657**	.002
Value	Contingent Noncontingent	85 78	4.72 4.17	1.408 1.522	.544*	.019

**Difference is significant at the 0.01 level (2-tailed)

*Difference is significant at the 0.05 level (2-tailed)

APPENDIX B

Table BI

Subgroup Means and Standard Deviations Using the INTEREST1 Median Split

	Medical Anthropology		Biological Conservation		All Cases	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
High Interest/ Contingent						
Verbatim	1.189	1.0804	1.279	.9815	1.238	1.0179
Propositional	.762	.5597	.827	.5528	.792	.5510
Situational	1.766	.5925	1.314	.8037	1.520	.7431
High Interest/ Noncontingent						
Verbatim	1.058	.8014	.908	.7515	.983	.7680
Propositional	1.139	.6698	.824	.4653	.981	.5894
Situational	1.491	.6619	1.044	.8844	1.267	.8013
Low Interest/ Contingent						
Verbatim	1.004	.7670	.983	.7379	.995	.7442
Propositional	.884	.7270	.651	.4555	.784	.6275
Situational	1.368	.8008	1.213	.9132	1.301	.8425
Low Interest/ Noncontingent						
Verbatim	.480	.7267	.673	1.0460	.581	.9029
Propositional	.804	.7900	.875	.6224	.841	.7004
Situational	1.295	.8418	.740	.9146	1.006	.9148
Contingent						
Verbatim	1.099	.9341	1.166	.8988	1.132	.9120
Propositional	.822	.6420	.760	.5193	.791	.5820
Situational	1.571	.7221	1.275	.8375	1.425	.7907
Noncontingent						
Verbatim	.723	.8024	.767	.9359	.746	.8680
Propositional	.945	.7511	.855	.559	.899	.6568
Situational	1.378	.7677	.862	.9038	1.113	.8742
High Interest						
Verbatim	1.134	.9629	1.138	.9096	1.136	.9294
Propositional	.920	.6287	.826	.5153	.871	.5703
Situational	1.650	.6291	1.211	.8352	1.420	.7721

Low Interest						
Verbatim	.736	.7839	.797	.9372	.766	.8564
Propositional	.843	.7512	.786	.5662	.815	.6655
Situational	1.137	.8903	.929	.932	1.137	.8903

Table BII

Subgroup Means and Standard Deviations Using the INTEREST2 Median Split

	Medical Anthropology		Biological Conservation		All Cases	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
High Interest/ Contingent						
Verbatim	1.069	1.0187	1.468	.9075	1.281	.9721
Propositional	.902	.5928	.858	.5328	.879	.5562
Situational	1.534	.7242	1.444	.8480	1.486	.7854
High Interest/ Noncontingent						
Verbatim	1.064	.8108	1.171	.7256	1.117	.7587
Propositional	1.335	.6034	.980	.4789	1.157	.5654
Situational	1.478	.4874	1.076	1.0048	1.277	.8032
Low Interest/ Contingent						
Verbatim	1.139	.8685	.803	.6361	.994	.7823
Propositional	.658	.7332	.514	.4582	.596	.6235
Situational	1.588	.7947	1.1493	.7818	1.398	.8064
Low Interest/ Noncontingent						
Verbatim	.476	.7158	.498	.9761	.487	.8522
Propositional	.661	.7308	.771	.6016	.719	.6613
Situational	1.305	.9250	.719	.8206	.999	.9116
Contingent						
Verbatim	1.099	.9466	1.247	.8776	1.172	.9104
Propositional	.798	.6586	.745	.5293	.771	.5951
Situational	1.557	.7455	1.346	.8281	1.452	.7895
Noncontingent						
Verbatim	.723	.8024	.767	.9359	.746	.8680
Propositional	.945	.7511	.855	.559	.899	.6568
Situational	1.378	.7677	.862	.9038	1.113	.8742
High Interest						
Verbatim	1.067	.9275	1.355	.8463	1.216	.8925
Propositional	1.078	.6274	.905	.5105	.989	.5729
Situational	1.511	.6310	1.304	.9168	1.403	.7942
Low Interest						
Verbatim	.765	.8436	.605	.8750	.687	.8570

Propositional	.660	.7222	.681	.5628	.670	.6453
Situational	1.428	.8712	.870	.8230	1.156	.8880

APPENDIX C

Table CI

Effects of Reward on High Interest Participants: T-tests Comparing Contingent vs. Noncontingent Conditions

Variable	REWARD	N	Mean	Standard Deviation	Mean Difference	Sig.(2-tailed)
Verbatim	Contingent	48	1.2380	1.0179	.2553	.206
	Noncontingent	32	.9827	.7680		
Propositional	Contingent	48	.7972	.5510	-.1843	.158
	Noncontingent	32	.9814	.5894		
Situational	Contingent	48	1.5208	.7431	.2534	.152
	Noncontingent	32	1.2674	.8013		
Rehearsal	Contingent	48	5.3750	1.5106	.7812	.035*
	Noncontingent	32	4.5938	1.7201		
Elaborations	Contingent	48	4.4074	.8753	.3727	.069
	Noncontingent	32	4.0347	.9029		
Concentration	Contingent	48	4.79	1.271	.542	.078
	Noncontingent	32	4.25	1.271		
Effort	Contingent	48	4.2500	1.7197	.1562	.660
	Noncontingent	32	4.0938	1.4224		
Interest Diff: TISII-TISI	Contingent	44	-.1264	.3919	.1327	.124
	Noncontingent	32	-.2591	.3308		

Table CII

Effects of Reward on Low Interest Participants: Contingent vs. Noncontingent Conditions

Variable	REWARD	N	Mean	Standard Deviation	Mean Difference	Sig.(2-tailed)
Verbatim	Contingent	37	.9950	.7442	.4142	.028*
	Noncontingent	46	.5808	.9029		
Propositional	Contingent	37	.7837	.6275	-.0573	.669
	Noncontingent	46	.8410	.7004		
Situational	Contingent	37	1.3008	.8425	.2953	.134
	Noncontingent	46	1.0056	.9148		
Rehearsal	Contingent	37	4.8378	1.8636	.6639	.116
	Noncontingent	46	4.1739	1.9126		
Elaborations	Contingent	37	3.8559	.8946	.0781	.713
	Noncontingent	46	3.7778	1.0059		
Concentration	Contingent	37	4.03	1.536	.962	.005**
	Noncontingent	46	3.07	1.511		
Effort	Contingent	37	4.0000	1.7638	.6304	.100
	Noncontingent	46	3.3696	1.6781		
Interest Diff TISII-TISI	Contingent	35	-.0006	.3874	.0586	.522
	Noncontingent	46	-.0591	.4186		

APPENDIX D

Table DI

Interest at the End of the Experiment as Related to Reward

	N	Contingent Mean	N	Noncontingent Mean	(Sig.2-tailed)	Mean Difference
Interested to learn more about topic	85	4.04	78	3.26	.008	.779
Willing participate similar study without reward or credit	85	3.05	78	2.51	.055	.534
Sustained Interest (Learn more+ Participate)	85	3.54	78	2.88	.009	.656

Table DII

Interest at the End of the Experiment as Related to Interest

	N	High Interest Mean	N	Low Interest Mean	(Sig 2-tailed)	Mean Difference
Interested to learn more about topic	80	4.45	83	2.90	.000	1.546
Willing participate similar study without reward or credit	80	3.21	83	2.39	.003	.827
Sustained Interest (Learn more+Participate)	80	3.83	83	2.64	.000	1.187

APPENDIX E

Table EI

T-tests Comparing Learning Strategies as Related to Reward

Learning Strategies	N	Contingent Mean	N	Noncontingent Mean	Sig.(2-tailed)	Mean Difference
1. Relate to personal events	85	2.55	78	2.62	.782	-.062
2. Relate to previous knowledge	85	5.06	78	4.64	.105	.418
3. Questions to focus reading	85	2.96	78	2.63	.229	.337
4. Create mental images	85	4.80	78	4.92	.626	-.123
5. Produce own ideas and thoughts	85	4.64	78	4.76	.609	-.121
6. Paraphrase while reading	85	4.46	78	3.96	.103	.497
7. Organize related ideas (chunking)	85	4.56	78	4.36	.451	.206
8. Go back to resolve confusion	85	5.36	78	4.68	**.020**	.685
9. Questions to assure understanding	85	3.34	78	2.71	**.019**	.636
10.Thought about essence/purpose	85	4.33	78	4.04	.284	.291
11. Rehearsal	85	5.14	78	4.35	**.004**	.795

12. Completely caught up in text	85	3.21	78	3.01	.437	.199
13. Felt I was really concentrating	85	4.46	78	3.55	**.000**	.908
14. Trying very hard to learn material	85	4.14	78	3.67	**.073**	.475
Elaborations=1-6,8-10 Cronbach's Alpha .76	85	4.17	78	3.88	.056	.284

Table EII

T-tests: Learning Strategies Related to INTEREST

Learning Strategies	N	High Interest Mean	N	Low Interest Mean	Sig.(2-tailed)	Mean Difference
1. Relate to personal events	80	2.75	83	2.42	.145	.328
2. Relate to previous knowledge	80	5.30	83	4.43	**.001**	.418
3. Questions to focus reading	80	3.01	83	2.60	.145	.410
4. Create mental images	80	4.89	83	4.83	.824	.056
5. Produce own ideas and thoughts	80	4.86	83	4.53	.159	.332
6. Paraphrase while reading	80	4.18	83	4.27	.768	-.090
7. Organize related ideas (chunking)	80	4.53	83	4.41	.672	.115
8. Go back to resolve confusion	80	5.43	83	4.66	**.009**	.762
9. Questions to assure understanding	80	3.38	83	2.71	**.015**	.664

10.Thought about essence/purpose	80	4.54	83	3.86	**.011**	.682
11. Rehearsal	80	5.06	83	4.47	**.034**	.593
12. Completely caught up in text	80	3.75	83	2.51	**.000**	1.244
13. Felt I was really concentrating	80	4.58	83	3.49	**.000**	1.081
14. Trying very hard To learn material	80	4.19	83	3.65	**.042**	.537
Elaborations=1-6,8-10	80	4.26	83	3.81	**.003**	.284

APPENDIX F

Table FI

Intercorrelations Between Sentences Types and Levels of Representation Measures: Medical Anthropology N=81

	1	2	**3**	4	5	**6**	7	8	**9**
1.Original	_	.10	**.69****	.12	.00	.10	.20	-20	.28*
2. Paraphrased (VERB)	.	. -	**-.66****	.24*	.53**	-.23*	-.04	.37**	-26*
3. VERB	.		-	-.08	-.38**	.24*	.18	-.43**	.40**
4. Paraphrased (PROP)	.			-	.30**	**.61****	.16	.17	-.02
5. Inference (PROP)					-	**-.57****	.07	.34**	**-.15**
6. PROP	.					-	.08	-.14	.14
7.Inference (SIT)	.						-	-.05	**.79****
8.False								-	**-.65****
9 SIT	.								-
10.Verbal SAT	.21	-.34**	**.43****	-.14	-.22	**.05**	.18	-.26*	**.28***

**Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table FII

Intercorrelations Between Sentences Types and Levels of Representation Measures: Biological Conservation N=82

	1	2	**3**	4	5	**6**	7	8	**9**
1.Original	_	-.20	**.76****	.05	- .06	.01	.32**	-12	.28*
2. Paraphrased (VERB)	.	. -	**-.79****	.53**	.44**	.08	-.03	.44**	-.28*
3. VERB	.		-	-.38**	-.33**	-.04	.18	-.37**	.36**
4. Paraphrased (PROP)	.			-	.53**	.47**	.09	.36**	-.18
5. Inference (PROP)					-	-.50**	.02	.54**	-.34**
6. PROP	.					-	.07	-.20	.17
7.Inference (SIT)	.						-	-.21	**.76****
8.False								-	**-.80****
9 SIT	.								-
10.Verbal SAT	.06	-.27*	**.22**	-.10	-.29*	**.22**	.16	-.38**	**. 35****

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table FIII

Intercorrelations Between Sentences Types and Levels of Representation Measures

All Cases N= 163

	1	2	**3**	4	5	**6**	7	8	**9**
1.Original	_	.02	**.70****	.05	.00	.05	.24**	-06	.20*
2. Paraphrased (VERB)	.	. -	**-.70****	.37**	.49**	-.11	-.01	.45**	-30**
3. VERB		.	-	-.23**	-.35*	.11	.18*	-.36**	.36**
4. Paraphrased (PROP)		.		-	.41**	**.55****	.13	.26**	-.30**
5. Inference (PROP)					-	**-.54****	.04	.45**	**-.27****
6. PROP		.				-	.08	-.17*	.16*
7.Inference (SIT)		.					-	-.15	**.75****
8.False								-	**-.76****
9 SIT		.							-
10.Verbal SAT N=138		.10	-.31**	**.30****	-.11	-.26**	**.13**	.17*	-.34**	**.33****

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

APPENDIX G

Table GI

T-Tests Comparing Means of OTT Component by Topic

	Medical Anthropology N = 73 Mean	Biological Conservation N=72 Mean	Sig. (2-tailed)	Mean Difference
Amount of organization*	22.6301	28.2778	.006	-5.64764
Hierarchical depth	1.1592	.8550	.031	.30421
Similarity to expert	.29	.11	.000	.18

*Amount of organization = PRO. The lower the score, the higher the amount of organization.

	Expert A	Expert B
Amount of organization	6.0	14.00
Hierarchical depth	3.06	1.25
Similarity to expert	1	1

APPENDIX H

Intercorrelations between Predictor Variables, Interest and Reward

Variable	1	2	3	4	5	6	7	8	9	10
1. Interest	-	.24**	.31**	.27**	.28**	.24**	.35**	.36**	.18*	.13
2. Reward		-	.06	.07	-.02.	.22**	.15	.29**	.14	.06
3. Intrinsic Motivation			-	.69**	.12	.23**	.29**	.15	.06	.26**
4. Extrinsic Motivation				-	.17*	.26**	.18*	.22*	.17*	.20**
5. Energetic Arousal					-	.34**	.35**	.25**	18*	.25**
6. Rehearsal						-	.60**	.45**	.43**	.42**
7. Elaborations							-	.57**	.38**	.50**
8. Concentration								-	.61**	.38**
9. Effort									-	.20*
10. Chunking										-

**Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

APPENDIX I

Correlations Between Predictor Variables and Reading Times

Variables	Time Reading Text	Time Doing TCT	Total Time
Interest Before Reading Text	.27**	.25**	.32**
Interest After Reading Text	.28**	.26**	.33**
Reward	.37**	.31**	.41**
Verbatim Representations	.22**	.15	.18*
Propositional Representations	.06	.03	.00
Situational Representations	.14	.22**	.17*
Intrinsic Motivation	.12	.01	.16
Extrinsic Motivation	.19*	.09	.16
Verbal Ability	-.02	-.04	.00 .
Prior Knowledge	.01	.03	.10
Really Concentrating	.31**	.26**	.35**
Caught Up in Text	.34**	.29**	.17*
Effort	.24**	.04	.15
Rehearsal	.18*	.10	.12
Elaborations	.24**	.21*	.23**

**Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

APPENDIX J

Table JI

ANCOVA: Effects of REWARD and TOPIC on Levels of Representation with Topic Interest 1*** as Covariate

N=163

Between Subjects Effects

SourceDependentVariable		df	Mean Square	F	Sig.
TopicInterest I	Verbatim	1	5.410	6.986**	.01
	Propositional	1	1.413	3.719	.06
	Situational	1	1.361	2.089	.15
REWARD	Verbatim	1	3.367	4.348*	.04
	Propositional	1	.9237	2.431	.12
	Situational	1	2.550	3.913*	.05
TOPIC	Verbatim	1	.023	.030	.86
	Propositional	1	.341	.898	.34
	Situational	1	7.179	11.016**	.01
REWARD*TOPIC					
	Verbatim	1	.007	.009	.92
	Propositional	1	.000	.000	.99
	Situational	1	.382	.586	.44
Error					
	Verbatim	155	.774		
	Propositional	155	.380		
	Situational	155	.652		

*** Topic Interest 1 = scores on Topic Interest Scale I (continuous variable)— after reading the topic summary and before reading the text passage.

**Significant at the 0.01 level

* Significant at the 0.05 level

Table JII

ANCOVA: Effects of REWARD and TOPIC on Levels of Representation with Topic Interest 2*** as Covariate

N=157

Between Subjects Effects

SourceDependentVariable		df	Mean Square	**F**	**Sig.**
TopicInterest I	Verbatim	1	11.295	15.481**	**.00**
	Propositional	1	3.203	8.480**	**.00**
	Situational	1	4.044	6.314*	**.01**
REWARD	Verbatim	1	3.357	4.601*	**.03**
	Propositional	1	1.433	3.795*	**.05**
	Situational	1	2.425	3.787*	**.05**
TOPIC	Verbatim	1	.087	.120	.73
	Propositional	1	.376	.995	.32
	Situational	1	5.992	9.355**	**.00**
REWARD*TOPIC					
	Verbatim	1	.036	.049	.82
	Propositional	1	.001	.004	.95
	Situational	1	.760	.586	.28
Error					
	Verbatim	155	.730		
	Propositional	155	.378		
	Situational	155	.641		

*** Topic Interest 2 = scores on Topic Interest Scale II (continuous variable)— after reading the topic summary and before reading the text passage.

**Significant at the 0.01 level

* Significant at the 0.05 level

Table JIII

Zero-Order and Partial Correlations for Relationships between Topic Interest I and Levels of Text Representation

			Before Reading the Text		
Sample N		Control Variable	Interest-VERB	Interest-PROP	Interest-SIT
163		--	.25**	.12	.13
138		Verbal SAT	.23**	..14	.12
66	Med Anthro	Verbal SAT	.15	.25*	.08
72	Biol Cons	Verbal SAT	.29*	-.01	.22(.07)
158		Prior Knowledge	.21*	.10	.15(.06)
79	Med Anthro	Prior Knowledge	.18	.18	.14
79	Biol Cons	Prior Knowledge	.26*	-.06	.18

Table JIV

Zero-Order and Partial Correlations for Relationships between Topic Interest II and Levels of Text Representation

Sample N	Control Variable	After Reading the Text Interest-VERB	Interest-PROP	Interest-SIT
157	--	.34**	.19*	.22**
134	Verbal SAT	.34**	.19*	.17*
64 Med Anthro	Verbal SAT	.22(09)	.24(.06)	.03
70 Biol Cons	Verbal SAT	.43**	.16	.36**
152	Prior Knowledge	.29**	.17*	.22**
76 Med Anthro	Prior Knowledge	.17	.18	.07
76 Biol Cons	Prior Knowledge	.44**	.14	.40**

Table JV

Zero-Order and Partial Correlations for Relationships between REWARD and Levels of Text Representation

Sample N	Control Variable	REWARD-VERB	REWARD-PROP	REWARD-SIT
163	--	.21**	-.09	.18*
138	Verbal SAT	.24**	-.01	.22**
144	Total SAT	.23*	-.02	.21*
66 Med Anth	Verbal SAT	.27*	.01	.15
72 Biol Cons	Verbal SAT	.20(.09)	-.01	.30*
158	Prior Knowledge	.19*	-.08	.19*

**Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

APPENDIX K

Table KI

T-Tests: Reasons for Participating in Study associated with REWARD

	N	Contingent Reason Mean	N	Noncontingent Mean	(Sig.2-tailed)	Mean Difference
Reward/Credit important	85	4.33	78	5.37	**.001**	-.042
Tasks interesting	85	3.02	78	2.78	.339	.241
Only fair because getting credit	85	5.69	78	5.88	.407	-.90
Might learn something	85	3.93	78	3.59	.195	.340
Wanted to help experimenter	85	4.13	78	5.60	**.000**	-.473
Wanted to win prize money	85	3.88	-	-	-	

*Only the Contingent group was offered bonus money as a reward.

Table KII

Reasons for Participating in Study associated with INTEREST

	N	High Interest Reason Mean	N	Low Interest Mean	(Sig.2-tailed)	Mean Difference
Reward/Credit important	80	4.94	83	4.72	.503	.215
Tasks interesting	80	3.20	83	2.63	**.022**	.573
Only fair because getting credit	80	6.01	83	5.57	**.051**	.446
Might learn something	80	4.26	83	3.29	**.000**	.340
Wanted to help experimenter	80	4.93	83	4.75	.508	.178
Wanted to win prize money	48*	3.85	37*	3.92	.876	-.065

*Only participants in Contingent condition were offered bonus money.

APPENDIX L

Materials Used in Experiment

CONSENT FORM FOR MAIN STUDY B

I, _____, agree to participate in a research study titled " Variables Influencing Text Learning " conducted by Michael E. Landau from the Department of Psychology at the University of Georgia (mlandau@uga.edu) under the direction of Dr. James M. Brown, Department of Psychology, University of Georgia (542-8045). I understand that my participation is voluntary. I can stop taking part without giving any reason, and without penalty. I can ask to have all of the information about me returned to me, removed from the research records, or destroyed.

The purpose of the study is to assess how well introductory textbooks communicate information.

The benefits that I may expect from this study are research participation credit and exposure to information about topics that may be new to me.

1) As part of this study, I will be asked to do the following things:

   Reading text passage

   I will read a brief summary of a topic, fill out a short scale indicating my feelings about the topic, and then read a passage from a textbook elaborating on the topic.

   Evaluation of text passage

   I will do several tasks that will provide information about the effectiveness of the text passage in communicating information. These tasks will include arranging terms in an order that reflects my understanding of the text, answering questions about the content of the text passage and giving my response to the passage, some biographical information (e.g. gender, major, etc.) and my reaction to the experiment. This should take approximately 1.5 hours.

4) No discomfort or stress is anticipated.
5) No risks are foreseen.
6) Any information that is obtained in connection with this study and that can be identified with me will remain confidential and will be disclosed only with my permission or as required by law. In order to make this study a valid one, some information about my participation will be withheld until after the study.

The investigator will answer any further questions about the research, now or during the course of the project (mlandau@uga.edu).

I understand that I am agreeing by my signature on this form to take part in this research project and understand that I will receive a signed copy of this consent form for my records.

_____	_____	_____
Name of Researcher	**Signature**	**Date**

Telephone: _____
Email: _____

_____	_____	_____
Name of Participant	**Signature**	**Date**

Please sign both copies, keep one and return one to the researcher.

Additional questions or problems regarding your rights as a research participant should be addressed to Chris A. Joseph, Ph.D. Human Subjects Office, University of Georgia, 606A Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address **IRB@uga.edu**

Consent form for the release of S.A.T. scores

Name_____
Please print

I.D. _____

I give my permission to release my S.A.T. scores to Michael E. Landau for use in a research project.

I understand that the information will be completely confidential.

Signature _____

Script for Main Study – Contingent group

1. If all of the participants are not present at the appointed time for the study to begin,

SAY: **"WE WILL WAIT ANOTHER FIVE MINUTES BECAUSE NOT ALL OF THE PARTICIPANTS HAVE COME YET."**

2. After waiting five minutes, close the door.

3. Distribute the consent forms

SAY: **"PLEASE SIGN BOTH OF THE CONSENT FORMS AND RETURN THEM TO ME."**

4. Wait a minute while the participants sign the consent form.

5. Collect consent forms.

6. Distribute test packets

SAY: **"PLEASE DO NOT OPEN THE ENVELOPE UNTIL YOU HAVE BEEN INSTRUCTED TO DO SO."**

7. After all of the test packets have been distributed,

SAY: **"NOW OPEN YOUR ENVELOPE, TAKE OUT BOOKLET A AND OPEN IT TO THE FIRST PAGE."**

"FIRST, YOU WILL READ A TOPIC SUMMARY AND COMPLETE AN INTEREST SURVEY ON THAT TOPIC. IT WILL ONLY TAKE A FEW MINUTES"

"WHEN YOU FINISH, **DO NOT TURN THE PAGE**. JUST RAISE YOUR HAND."
"BEGIN NOW"

Wait until all hands are up
When all hands are up.

SAY **"NOW TURN TO THE NEXT PAGE. FOLLOW ALONG AS I READ THE INSTRUCTIONS."**

"THE PURPOSE OF THIS STUDY IS TO FIND OUT WHICH VARIABLES INFLUENCE TEXT LEARNING.

"WE WOULD LIKE YOU TO READ AND EVALUATE A PASSAGE FROM A TEXTBOOK. AFTERWARDS YOU WILL BE ASKED TO TAKE A TEST AND ANSWER SOME QUESTIONS TO HELP US EVALUATE THE TEXT."

SAY: **"EVERYONE WILL GET CREDIT FOR COMPLETING THE TASKS.**

BUT IN ADDITION,
THERE WILL BE BONUS MONEY FOR THE 20% OVERALL WHO DO PERFORM THE BEST ON THE TEXT COMPREHENSION TEST."

THE MONEY WILL BE AWARDED AS FOLLOWS:

TOP 1 $150

NEXT 2 $100 EACH

NEXT 4 $ 75 EACH

NEXT 6 $ 50 EACH

"THE MONEY WILL BE MAILED TO THE PEOPLE WITH THE HIGHEST SCORES AFTER ALL THE TESTS ARE SCORED. CLIPPED TO THIS BOOKLET, THERE IS AN INDEX CARD WITH A CODE NUMBER ON IT. PLEASE WRITE YOUR NAME, SOCIAL SECURITY NUMBER, PERMANENT ADDRESS, AND E-MAIL ADDRESS ON THE CARD. THIS INFORMATION WILL BE USED TO CONTACT YOU IF YOU EARN SOME MONEY.

"AS YOU READ THE TEXT PASSAGE, YOU may underline or write in the margins,

IF YOU WISH. However, you won't be able to refer back to it when you are answering the questions.

"AFTER YOU HAVE COMPLETED BOOKLET A, PUT IT BACK IN THE ENVELOPE AND TAKE OUT BOOKLET B.

"BOOKLET B CONTAINS THE TEXT COMPREHENSION TEST, A WORD ASSOCIATION TASK, AND QUESTIONNAIRES. REMEMBER: THE BONUS WILL BE BASED ONLY ON THE TEXT COMPREHENSION TEST.

"READ THROUGH THE MATERIALS AT YOUR OWN PACE UNTIL YOU FEEL THAT YOU FULLY UNDERSTAND THEM. DO NOT LOOK AT THE MATERIAL IN BOOKLET A WHILE YOU ARE COMPLETING BOOKLET B."

"BE CAREFUL NOT TO SKIP ANY PAGES OR QUESTIONS. PLEASE BE SURE TO WRITE THE TIMES IN THE SPACES PROVIDED. PLEASE BE SURE TO ALWAYS USE THE SAME TIMEPIECE."

"IF YOU HAVE ANY QUESTIONS ABOUT WHAT YOU NEED TO DO, PLEASE FEEL FREE TO ASK."

Pause briefly

SAY: **"WHEN YOU HAVE FINISHED EVERYTHING, PUT BOTH BOOKLETS IN THE ENVELOPE AND RETURN IT TO ME. DO NOT FORGET TO GIVE ME YOUR WHITE CARD SO THAT I CAN SIGN IT. NOW-- TURN THE PAGE AND BEGIN READING."**

8. When the participant returns the test packet, sign the white card and return the white card! Ask the person "DID YOU REMEMBER TO FILL OUT THE CONTACT CARD FOR THE BONUS MONEY?"

9. Give the participant the debriefing statement, and thank him or her for participating!

C

INSTRUCTIONS

The purpose of this study is to examine the interaction between the text and the learner. We would like you to read and evaluate a passage from a textbook. Afterwards you will be asked to take a test and answer some questions to help us evaluate the text.

Everyone will get credit for completing the tasks.
But, in addition, there will be bonus money for the 20% overall who perform the best on the Text Comprehension Test.

The money will be awarded as follows:

TOP 1 $150

NEXT 2 $100 EACH

NEXT 4 $ 75 EACH

NEXT 6 $ 50 EACH

The money will be mailed to the people with the highest Text Comprehension Test scores after **all** the tests are scored. Clipped to this booklet, there is an index card with a code number on it. Please write your name, social security, permanent address and e-mail address on the card. This information will be used to contact you if you earn some money.

As you read the text passage, you may underline or write in the margins, if you wish. However, you won't be able to refer back to it when you are answering the questions. After you have completed Booklet A, put it back in the envelope and take out Booklet B.

Booklet B contains the Text Comprehension Test, a word association task, and questionnaires. Remember: The bonus will be based **only** on the Text Comprehension Test.

Read through the materials at your own pace until you feel that you fully understand them. Do not look at the material in Booklet A while you are completing Booklet B.
Be careful not to skip any pages or questions. Please be sure to write the **times** in the spaces provided. If you have any questions about what you need to do, please feel free to ask.

When you have finished everything, put both booklets in the envelope and return it to me. Do not forget to give me your white card so that I can sign it.

NOW—turn the page and begin reading.

Script for Main Study – Non-contingent group

1. If all of the participants are not present at the appointed time for the study to begin,

SAY: **"WE WILL WAIT ANOTHER FIVE MINUTES BECAUSE NOT ALL OF THE PARTICIPANTS HAVE COME YET."**

2. After waiting five minutes, close the door.

3. Distribute the two consent forms

SAY: **"PLEASE SIGN BOTH OF THE CONSENT FORMS AND RETURN THEM TO ME."**

4. Wait a minute while the participants sign the consent forms.

5. Collect consent forms.

At this time, confederate comes into room with armload of envelopes & whispers something to the research assistant. Sets down the envelopes (experimental materials) and leaves.

SAY **(BUT do NOT read from the script)**: **WE HAVE A PROBLEM.**

we were going to do the first part of the experiment here and the second part in the computer lab. However, there has been an UNEXPECTED PROBLEM with the computer software, so WE CAN'T carry out the experiment as planned. Since you CAME FOR that experiment, you will receive credit anyway. ……..

However, we would REALLY appreciate it if you would stay to help us with A SIMILAR study that can be done

with pencil-and-paper ONLY.

6. Wait a moment for those who do not want to participate to leave.

7. Distribute envelopes.

SAY: **"PLEASE DO NOT OPEN THE ENVELOPE UNTIL YOU HAVE BEEN INSTRUCTED TO DO SO."**

8. After all of the envelopes have been distributed,

SAY: "**NOW OPEN YOUR ENVELOPE, TAKE OUT BOOKLET A. "**

"CLIPPED TO BOOKLET A YOU WILL FIND AN INDEX CARD WITH A CODE NUMBER ON IT. PLEASE WRITE YOUR NAME AND SOCIAL SECURITY NUMBER ON THE CARD. THIS INFORMATION WILL BE USED TO MATCH YOUR SAT SCORE WITH THE CODE NUMBER, AND THEN THE CARD WILL BE DESTROYED."

AFTER YOU HAVE WRITTEN YOUR NAME AND SOCIAL SECURITY NUMBER, PUT THE CARD BACK IN THE ENVELOPE.

Wait a minute while participants write names on cards.

"NOW OPEN BOOKLET A TO THE FIRST PAGE.

"FIRST, YOU WILL READ A TOPIC SUMMARY AND COMPLETE AN INTEREST SURVEY ON THAT TOPIC. IT WILL TAKE ONLY A FEW MINUTES.

"**WHEN YOU FINISH, DO NOT TURN THE PAGE. JUST RAISE YOUR HAND."**
"**BEGIN NOW**!"

Wait until all hands are up.

When all hands are up,

SAY: "**NOW TURN TO THE NEXT PAGE. FOLLOW ALONG AS I READ THE INSTRUCTIONS.**

"**THE PURPOSE OF THIS STUDY IS TO FIND OUT WHICH VARIABLES INFLUENCE TEXT LEARNING.**

''We would like you to read and evaluate A PASSAGE from a textbook. You will be asked to take a test AND answer some QUESTIONS AFTERWARDS to help us evaluate the text."

"AS YOU READ, YOU MAY UNDERLINE OR WRITE IN THE MARGINS OF THE TEXT PASSAGE, IF YOU WISH. HOWEVER, YOU WON'T BE ABLE TO REFER BACK TO IT WHEN YOU ARE ANSWERING THE QUESTIONS.

"AFTER YOU HAVE COMPLETED BOOKLET A, PUT IT BACK IN THE ENVELOPE AND TAKE OUT BOOKLET B. BOOKLET B CONTAINS A TEXT COMPREHENSION TEST, A WORD ASSOCIATION TASK, AND QUESTIONNAIRES.

"READ THROUGH THE MATERIALS AT YOUR OWN PACE UNTIL YOU FEEL THAT YOU FULLY UNDERSTAND THEM. DO NOT LOOK AT THE MATERIAL IN BOOKLET A WHILE YOU ARE COMPLETING BOOKLET B.

"BE CAREFUL NOT TO SKIP ANY PAGES OR QUESTIONS. PLEASE BE SURE TO WRITE THE TIMES IN THE SPACES PROVIDED.
IF YOU HAVE ANY QUESTIONS ABOUT WHAT YOU NEED TO DO, PLEASE FEEL FREE TO ASK. "

Pause briefly

SAY: **"WHEN YOU HAVE FINISHED EVERYTHING, PUT THE BOTH BOOKLETS IN THE ENVELOPE AND RETURN IT TO ME. DO NOT FORGET TO GIVE ME YOUR WHITE CARD SO THAT I CAN SIGN IT."**

"**NOW-- TURN THE PAGE AND BEGIN READING!"**

9. When the participant returns the test packet, sign the white card and return the white card!

10. Give the participant the debriefing statement, and thank him or her for participating!

INSTRUCTIONS

The purpose of this study is to examine the interaction between the text and the learner. We would like you to read and evaluate a passage from a textbook Afterwards you will be asked to take a test and answer some questions to help us evaluate the text.

As you read, you may underline or write in the margins of the text passage, if you wish. However, you won't be able to refer back to it when you are answering the questions.
After you have completed Booklet A, put it back in the envelope and take out Booklet B. Booklet B contains a text comprehension test, a word association task, and questionnaires.

Read through the materials at your own pace until you feel that you fully understand them. Do not look at the material in Booklet A while you are completing Booklet B.
Be careful not to skip any pages or questions. Please be sure to write the **times** in the spaces provided. If you have any questions about what you need to do, please feel free to ask.

When you have finished everything, put both booklets in the envelope and return it to me.
Do not forget to give me your white card so that I can sign it.

NOW—turn the page and begin reading.

The summary you are going to read is about medical anthropology. After you read the summary, we want you to give your opinion of the topic.

Medical Anthropology

This article introduces the growing field of medical anthropology that studies the relationship between culture and disease. It tells how cultural factors can lead to the spread of a disease and create an epidemic. Different cultural theories about the causes of disease are discussed. Some aspects of non-industrialized and Western health-care systems are compared. An example is given of a disease that seems to be a response to oppressive working conditions interacting with cultural beliefs.

Now you have an idea what the topic is about and will be able to circle the appropriate numbers reflecting your opinion on the scale below:

If I read a text passage on the same topic as the summary on **Medical Anthropology,** I would expect to feel:

	not at all		some-what			quite		very
bored	0	1	2	3	4	5	6	7

stimulated	0	1	2	3	4	5	6	7
interested	0	1	2	3	4	5	6	7
involved	0	1	2	3	4	5	6	7

To me personally, the topic "**Medical Anthropology**" is

	not at all		some-what			quite		very
meaningful	0	1	2	3	4	5	6	7
useful	0	1	2	3	4	5	6	7
worthless	0	1	2	3	4	5	6	7
relevant	0	1	2	3	4	5	6	7

TURN TO THE NEXT PAGE

WRITE THE TIME HERE_____

Medical Anthropology

Many kinds of anthropologists work in medical anthropology: biological and cultural, academic and applied. This growing field considers the sociocultural context and implications of disease and illness. Disease refers to a scientifically identified health threat caused by a bacterium, virus, fungus, parasite, or other pathogen. Illness is a condition of poor health felt by an individual. Cross-cultural research shows that perceptions of good and bad health, along with health threats and problems, are culturally constructed. Different ethnic groups and cultures recognize different illnesses, symptoms, and causes and have developed different health care systems and treatment strategies.

Disease also varies among cultures. Traditional and ancient foragers, because of their small numbers, mobility, and relative isolation from other groups, lacked most of the epidemic infectious

diseases that affect agricultural and urban societies. Epidemic diseases like cholera, typhoid, and bubonic plague thrive in dense populations, and thus among farmers and city dwellers. The spread of malaria has been linked to the population growth and deforestation associated with food production.

Certain diseases have spread with economic development. Schistosomiasis (liver flukes) is probably the fastest-spreading and most dangerous parasitic infection now known. It is spread by snails that live in ponds, lakes, and waterways, usually ones created by irrigation projects. A study done in a Nile Delta village in Egypt illustrated the role of culture (religion) in the spread of schistosomiasis. The disease was more common among Muslims than among Christians because of an Islamic practice called wudu, ritual ablution (bathing) before prayer. In eastern Africa AIDS and other sexually transmitted diseases (STDs) have spread along highways, via encounters between male truckers and female prostitutes. STDs are also spread through prostitution as young men from rural areas seek wage work in cities, labor camps, and mines. When the men return to their home villages, they infect their wives. Cities have also been prime sites of STD transmission in Europe, Asia, and North and South America.

We see that the incidence of particular diseases varies between societies, and cultures interpret and treat illness differently. Standards for sick and healthy bodies are cultural constructions that vary in time and space. Still, all societies have "disease-theory systems" to identify, classify, and explain illness. According to Foster and Anderson (1978), there are three basic theories about the causes of illness: personalistic, naturalistic, and emotionalistic. Personalistic disease theories blame illness on agents (often malicious), such as sorcerers, witches, ghosts, or ancestral spirits. Naturalistic disease theories explain illness in impersonal terms. One example is Western medicine or biomedicine, which links illness to scientifically demonstrated agents, which bear no personal malice toward their victims. Thus Western medicine attributes illness to organisms (e.g., bacteria, viruses, fungi, or parasites) or toxic materials. Other naturalistic

systems blame poor health on unbalanced body fluids. Many Latin cultures classify food, drink, and environmental conditions as "hot" or "cold." People believe their health suffers when they eat or drink hot or cold substances together or under inappropriate conditions. One shouldn't drink something cold after a hot bath or eat a pineapple (a "cold" fruit) when one is menstruating (a "hot" condition).

Emotionalistic disease theories assume that emotional experiences cause illness. For example, Latin Americans may develop susto, an illness caused by anxiety or fright. Its symptoms (lethargy, vagueness, distraction) are similar to those of "soul loss," a diagnosis of similar symptoms made by people in Madagascar. Modern psychoanalysis also focuses on the role of the emotions in physical and psychological well-being.

All societies have health care systems--beliefs, customs, specialists, and techniques aimed at ensuring health and preventing, diagnosing, and curing illness. A society's illness-causation theory is important for treatment. When illness has a personalistic cause, shamans and other magic or religious specialists may be good curers. They draw on varied techniques (occult and practical), which make up their special expertise. A shaman may cure soul loss by enticing the spirit back into the body. Shamans may ease difficult childbirths by asking spirits to travel up the vagina and guide the baby out. A shaman may cure a cough by counteracting a curse or removing a substance introduced by a sorcerer.

All cultures have health care specialists. If there is a "world's oldest profession" besides hunter and gatherer, it is curer, or shaman. The curer's role has some universal features. Thus curers emerge through a culturally defined process of selection (parental prodding, inheritance, visions, dream instructions) and training (apprentice shamanship, medical school). Eventually, the curer is certified by older practitioners and acquires a professional image. Patients believe in the skills of the curer, whom they consult and compensate.

We should not lose sight of the difference between scientific medicine and Western medicine per se. Despite advances in pathology, microbiology, biochemistry, surgery, diagnostic technology, and applications, many Western medical procedures have little basis in logic or fact. Overprescription of tranquilizers and drugs, unnecessary surgery, and the impersonality and inequality of the physician-patient relationship are questionable features of Western medical systems.

Still, biomedicine is better than tribal treatment in many ways. Although medicines like quinine, coca, opium, ephedrine, and rauwolfia were discovered in nonindustrial societies, traditional medicines are not as effective against bacteria as antibiotics are. Preventive health care has improved during the twentieth century. Today's surgical procedures are safer and more effective than those of traditional societies.

But industrialization has created its own health problems. Modern stressors include noise,

air and water pollution, poor nutrition, dangerous machinery, impersonal work, isolation, poverty, homelessness, and substance abuse. Health problems in industrial nations are due as much to economic, social, political, and cultural factors as to pathogens. In modern North America, for example, poverty contributes to many illnesses, including arthritis, heart conditions, back problems, and hearing and vision impairment. Poverty is even a factor in the differential spread of infectious diseases.

Medical anthropology has both theoretical and applied dimensions. Anthropologists have served as cultural interpreters in public health programs, which must pay attention to native theories about the nature, causes, and treatment of illness. Successful health interventions are not forced on communities. They must fit into local cultures and be accepted by local people. When Western medicine is introduced, people usually keep many of their old methods while also accepting new ones. Native curers may go on treating certain conditions (like susto or spirit possession), whereas M.D.s may deal with others. If both modern and traditional specialists are consulted and the patient is cured, the native curer may get more credit than the physician.

A more personal treatment of illness that emulates the non-Western curer-patient-community relationship could help Western systems. Western medicine tends to draw a rigid line between biological and psychological causation. Non-Western theories usually lack this sharp distinction, recognizing that poor health has intertwined physical, emotional, and social causes. The mind-body opposition is part of Western folk classification, not of science.

The following case study shows how a set of symptoms is interpreted by a personalistic theory of disease in one culture, but can be understood by a medical anthropologist to have economic, social, emotional and cultural roots.

Successive waves of integration into the world system have washed over Malaysia, a former British colony. The Malays have seen sea trade, conquest, the influx of British and Chinese capital, and immigration from China and India. For centuries Malaysia has been part of the world system, but the immediate effects of industrialization, including effects on mental health, are recent. The Malaysian government has promoted export-oriented industry to bring rural Malays into the capitalist system. This has been done in response to rural discontent over poverty and landlessness as some 10,000 families per year are pushed off the land. For the past three decades transnational companies

have been bringing labor-intensive manufacturing operations to rural Malaysia. The number of jobs in agriculture has steadily decreased as manufacturing jobs grow in number.

The industrialization of Malaysia is part of a global strategy. To escape the mounting labor costs in their home countries, corporations headquartered in Japan, Western Europe, and the United States have been moving labor-intensive factories to countries with lower labor costs. Malaysia now has hundreds of Japanese and American subsidiaries, which mainly produce clothes, food, and electronics parts. In electronics plants in rural Malaysia, thousands of young women from peasant families now assemble microchips and microcomponents for transistors and capacitors. For example, Ong (1987) did a study of electronics assembly workers in an area where 85 percent of the workers were young unmarried females from nearby villages.

Ong found that factory discipline and social relations contrasted strongly with traditional community life. Previously, agricultural cycles and daily prayers, rather than production quotas and work shifts, had framed the rural economy and social life. Villagers had planned and done their own work, without bosses. In factories, however, village women had to cope with a rigid work routine and constant supervision by men.

Factory relations of production featured a hierarchy, pay scale, and division of labor based on ethnicity and gender. Japanese men filled top management, while Chinese men were the engineers and production supervisors. The Malay men also worked as supervisors of the factory work force, which consisted of nonunion female semiskilled workers from poor Malay peasant families.

The Japanese firms in rural Malaysia were paternalistic. Managers assured village parents that they would care for their daughters as though they were their own. Unlike the American firms, the Japanese subsidiaries worked hard at maintaining good relations with rural elders. Management gave money for village events, visited workers' home communities, and invited parents to the plant for receptions. In return, village elders accorded high status to the Japanese managers. The elders colluded with the managers to urge young women to accept and stay with factory work.

The discipline, diligence, and obedience that factories value is learned in local schools, where uniforms help prepare girls for the factory dress code. Peasant women wear loose, flowing tunics, sarongs, and sandals, but factory workers must wear tight overalls and heavy rubber gloves, in which they feel constrained and controlled.

Assembling electronics components requires precise, concentrated labor. Labor in these factories is demanding, exhausting, depleting, and dehumanizing. It illustrates the separation of intellectual and manual activity that Marx considered the defining feature of industrial work. One woman said about her bosses "they exhaust us very much, as if they do not think that we too are human beings" (Ong, 1987, p. 202). Nor does factory work bring women much in the way of financial reward, given low wages, job uncertainty, and family claims on wages. Young woman typically work just a few years. Production quotas, three daily shifts, overtime, and close supervision take their toll in mental and physical exhaustion.

One response to factory discipline and relations of production is spirit possession, which Ong interprets as an unconscious protest against labor discipline and male control of the industrial setting. Sometimes possession takes the form of mass hysteria. The spirits have simultaneously invaded as many as 120 factory workers at one time. Weretigers (the Malay equivalent of the werewolf) come to avenge the construction of a factory on aboriginal burial grounds. Disturbed earth and grave spirits swarm on the shop floor. First the women see the spirits; then their bodies are invaded. The women become violent and scream abuses. The vengeful weretigers send the women into sobbing, laughing, and shrieking fits. To deal with possession, factories hire local medicine men, who sacrifice chickens and goats to fend off the spirits. This solution works only some of the time; possession still goes on. Factory women continue to act as vehicles to express the anger of avenging ghosts and their own frustrations.

Ong argues that spirit possession expresses anguish caused by a resistance to oppressive working conditions. However, she also notes that by using this form of rebellion, factory women avoid a direct confrontation with the source of their distress. Ong concludes that spirit possession, while expressing repressed resentment, doesn't do much to modify factory conditions. (Unionization would do more.) Spirit possession may even help maintain the current conditions of inequality and dehumanization by operating as a safety valve for accumulated tensions.

WRITE THE TIME HERE_____

TURN TO THE NEXT PAGE

PLEASE WRITE THE TIME HERE_____

Text Comprehension: MEDICAL ANTHROPOLOGY

Recognition of Sentences

Here is a list of 28 sentences related to the text you have just read. A few of the sentences correspond word for word to the text. These sentences can be identified as **original sentences** taken verbatim from the text. In contrast, other sentences have been changed to a greater or lesser degree. These sentences are consistent with the content of the text (i.e. you will not find any incorrect assertions) but do not occur verbatim in it.

Please read each sentence carefully and circle YES in the left column if, in your opinion, the sentence occurred verbatim in the text. However, if you think a sentence has not been taken word for word from the text, even though it expresses the same idea in different words, then circle NO in the right column. If you are not sure about a sentence, do not spend a lot of time contemplating an answer. Just use your best judgment to make a spontaneous decision.

Please circle only one answer per sentence.

	Original sentence?
01. The female Malay employees become mentally and physically exhausted in a few years as a result of the pressure of production quotas, shift work, long work hours, and close male supervision.	YES NO
02. Susto is a Latin American disease caused by anxiety and fear.	YES NO
03. In Malaysia, most of the people who work on the assembly lines are young, unmarried females from rural villages.	YES NO
04. Spirit possession helps to maintain the status quo because it does not do anything to change the conditions that cause it to occur.	YES NO
05. Factory relations in the electronics plants feature a hierarchy with the Japanese at the top and the Malay woman assembly workers at	YES NO

the bottom.

06. In adapting to factory conditions, workers lose control of their lives. YES NO

CONTINUED ON THE NEXT PAGE

07. Historically, the shift from hunting and gathering to agriculture led to an increase in deaths from epidemic diseases. YES NO

08. Life in modern society has its own health problems, which include stress from noise, air and water pollution, inadequate diet, workplace accidents, loneliness and drug abuse. YES NO

09. If both modern and traditional specialists are consulted and the patient is cured, the native curer may get more credit than the physician. YES NO

10. The symptoms of an illness can be an unconscious expression of anger. YES NO

11. The curer's role has some features that are universal among all cultures. YES NO

12. All cultures have health care specialists. YES NO

13. Western medicine and traditional healing practices can be successfully combined. YES NO

14. American firms in Malaysia paid little attention to maintaining good community relations. YES NO

15. The values of discipline and obedience that are inculcated in the local schools prepare the girls for following factory rules. YES NO

16. A society's illness-causation theory is important for treatment. YES NO

17. In many Latin cultures it would be considered unwise to eat a pineapple after taking a hot bath. YES NO

18. Successive waves of integration into the would system washed over Malaysia. YES NO

19. Poverty is a contributing factor in many types of illness. YES NO

20. Factory owners would rather treat the symptoms of spirit possession than address the underlying causes. YES NO

21. The field of medical anthropology deals with how culture affects attitudes toward sickness and the treatment of disease. YES NO

CONTINUED ON THE NEXT PAGE

22. Emotionalistic disease theories assume that emotional experiences cause illness. YES NO

23. Overprescription of medicines and unnecessary surgery are problems of Western medical practice. YES NO

24. Spirits entering the bodies of female factory workers cause them to become violent and abusive. YES NO

25. There is a high rate of AIDS infection among prostitutes in eastern Africa. YES NO

26. Cities have also been prime sites of STD transmission in Europe, Asia, and North and South America. YES NO

27. Assembling electronics components requires precise, concentrated labor. YES NO

28. Division of labor in the factory is based on gender and ethnicity. YES NO

CONTINUED ON THE NEXT PAGE

True or False?

Below are 13 sentences that have **not** been taken verbatim from the text you have just read. They are either true or false statements about the text. According to the text, several of the sentences below are true. You will have to infer from the text which sentences these are. Other sentences are false, and they contradict statements made in the text.

Please read the sentences carefully. For each sentence, decide whether it is **true** or **false**. Then circle TRUE in the left column if, in your opinion, the sentence is true. However, if you think the sentence is false, circle FALSE in the column to the right. If you are unsure about a sentence, do not spend a lot of time contemplating an answer. Just use your best judgment to make a spontaneous decision.

Please circle only one answer per sentence.

	According to the text	
01. Tranquilizers are used to treat the mass hysteria that sometimes occurs among female assembly workers in Malaysian factories.	TRUE	FALSE
02. Personalistic disease theories are found in cultures where people see the world as filled with agents who intend to harm them.	TRUE	FALSE
03. Culture does not affect the incidence of disease, only the the perception of illness.	TRUE	FALSE
04. In Africa, AIDS is predominantly a heterosexual disease.	TRUE	FALSE
05. Medicine men are very effective in keeping the evil spirits out of the factories.	TRUE	FALSE
06. When Western medicine is introduced into a community, the native curers are usually forced to find other occupations.	TRUE	FALSE
07. The overuse of tranquilizers and drugs in modern society may be an outcome of problems within the physican-patient relationship.	TRUE	FALSE
08. If factory owners understood the underlying cause of spirit possession, they would surely take steps to remedy it.	TRUE	FALSE

CONTINUED ON THE NEXT PAGE

09. Women workers in Malaysia would be afraid to join unions.	TRUE	FALSE

10. Japanese companies gained a great deal of information about the local culture in order to run their factories. TRUE FALSE

11. Western medical systems stress the curer-patient-community relationship. TRUE FALSE

12. Research has shown that traditional healing practices are generally ineffective. TRUE FALSE

13. Personalistic disease theories are least common in Western cultures. TRUE FALSE

14. Waterways in the Nile Delta are infested with snails. TRUE FALSE

WRITE THE TIME HERE_____AND TURN TO THE NEXT PAGE

Ordered Tree Task

Trial 1

Please arrange the following terms on the space provided starting with first space, so that concepts that are closely related in terms of their meaning in the medical anthropology text passage will be close to each other. You may start with any term of the 16 given. Be sure to use all 16 terms.

mind-body opposition	ancestral spirits	1._____
shamans	hot/cold together	2._____
impersonality	soul loss	3._____
ritual bathing	snails	4._____
		5._____
		6._____
		7._____
sorcerers	unbalanced body fluids	8._____
organisms	highway spread	9._____
psychoanalysis	traditional medicines	10._____
AIDS	antibiotics	11._____
		12._____
		13._____
		14._____
		15._____
		16._____

TURN TO THE NEXT PAGE

The summary you are going to read is about biological conservation. After you read the summary, we want you to give your opinion of the topic.

Biological Conservation

This article discusses many of the reasons for conserving endangered species. These include reasons based on usefulness, the interrelatedness of organisms, the beauty of diverse species, the moral right of species to exist, and the role that species play in the culture of native peoples. The last section of the article describes how humans have brought about the extinction of species through such activities as hunting, harvesting, and deforestation.

Now you have an idea what the topic is about and will be able to circle the appropriate numbers reflecting your opinion on the scale below:

If I read a text passage on the same topic as the summary on **Biological Conservation,** I would expect to feel:

	not at all		some-what			quite		very
bored	0	1	2	3	4	5	6	7
stimulated	0	1	2	3	4	5	6	7
interested	0	1	2	3	4	5	6	7
involved	0	1	2	3	4	5	6	7

To me personally, the topic "**Biological Conservation**" is

	not at all		some-what			quite		very
meaningful	0	1	2	3	4	5	6	7
useful	0	1	2	3	4	5	6	7
worthless	0	1	2	3	4	5	6	7
relevant	0	1	2	3	4	5	6	7

TURN TO THE NEXT PAGE

WRITE THE TIME HERE_____

Biological Conservation

The Goals of Biological Conservation

When we say that we want to save a species, what is it that we really want to save? The answers go beyond science and call for an integration of science and values. The possibilities include four goals:

1. A wild creature in a wild habitat, as a symbol to us of wilderness.
2. A wild creature in a managed habitat, so that the species persists, feeds, and reproduces with little interference and so that we can see it in a naturalistic habitat. (The recovery of the Aleutian goose fits this goal.)
3. Preservation of a population in a zoo so that the genetic characteristics are maintained in live individuals.
4. Conservation of genetic material only—frozen cells containing DNA from a species for future scientific research.

Although the specific goals of conservation are rarely spelled out in this fashion, policies and actions differ widely depending on which goal is chosen. This is a list of what we want to see as a product of our work to help an endangered species. Another important list includes the *reasons* for conservation of endangered species.

Reasons for the Conservation of Endangered Species

Some important reasons for conserving endangered species can be classified as utilitarian, ecological, aesthetic, moral, and cultural.

Utilitarian justification

Utilitarian justification is based on the consideration that many wild species might be useful to us; thus it is imprudent to destroy them before we have a chance to test their uses. Many of the

arguments presented for the conservation of endangered species, and for biological diversity in general, have focused on the utilitarian justification.

One utilitarian justification is the need to conserve wild strains of grains and other crops. Modern agricultural production of crops such as wheat and corn depends on the continued introduction of fresh genetic characteristics from wild strains to create new genetic hybrids. Disease organisms that attack crops evolve continually, changing their genetic characteristics.

As new disease strains develop, crops become vulnerable. By introducing fresh genetic characteristics from the wild, new hybrid strains can be developed that are disease-resistant.

Related to this justification is the possibility of finding new crops among the many species of plants. Many horticultural crops and products have come from tropical rain forests. Hopes are high that new products will be found. For example, of 275 species found in 1 ha (0.4 acre) in a Peruvian tropical forest, 72 yielded products with direct economic value.

Another utilitarian justification for biological conservation is that many important chemical compounds come from wild organisms. Digitalis, an important drug in treating certain heart ailments, comes from purple foxglove. Aspirin is a derivative of willow bark. A recent example was the discovery of a cancer-fighting chemical named *Taxol* in the Pacific Yew tree (genus name *Taxus,* hence the name of the chemical).

Well-known medicines derived from tropical forests include anticancer drugs from rosy periwinkles, steroids from Mexican yams; antihypertensive drugs from serpent wood; and antibiotics from tropical fungi. Some 25% of prescriptions dispensed in the United States contain ingredients extracted from vascular plants. Only a small fraction of the estimated 270,000 existing plant species are used for drugs. Other organisms may produce useful medical compounds that are as yet unknown. For example, scientists are testing marine organisms for use in pharmaceutical drugs. Coral reefs offer a promising area of study for such compounds, because many coral reef species produce toxins to defend themselves.

Some species are also used directly in medical research. For example, the armadillo is one of only two animal species known to contract leprosy. Thus, it is important to studies seeking a cure for disease. Other animals, such as the horseshoe crab and barnacles, are important because of physiologically active compounds they make. Others may have similar uses as yet unknown to us.

Another utilitarian justification is that many species provide pollution control. Plants, fungi, and bacteria remove toxic substances from air, water, and soils. Carbon dioxide and sulfur dioxide are removed by vegetation. Carbon monoxide is reduced and oxidized by soil fungi and bacteria, and nitric oxide is incorporated into the biological nitrogen cycle. Because species have different capabilities for removal, a diversity of species can provide the best range of pollution control.

Tourism provides yet another utilitarian justification. Ecotourism is a growing source of income for many developing countries. Of course, ecotourism occurs because the tourists value nature, including its endangered species. This value is usually aesthetic or spiritual; so the *result* of aesthetic and spiritual justifications can be utilitarian activity.

Ecological Justification

When we reason that organisms are necessary to maintain the functions of ecosystems and the biosphere, we are using an ecological justification for their conservation. Individual species, entire ecosystems, and the biosphere provide public service functions essential or important to the persistence of life. As such they are indirectly necessary for our survival. When bees pollinate flowers, for example, they provide a benefit that would be costly to

replace with human labor. Trees remove certain pollutants from the air. Some soil bacteria fix nitrogen, converting it from molecular nitrogen in the atmosphere to nitrate and ammonia that can be taken up by other living things. The fact that some such functions involve the entire biosphere reminds us of the global perspective on conserving nature and specific species.

Aesthetic Justification

An aesthetic justification asserts that biological diversity adds to the quality of life, providing some of the most beautiful and appealing aspects of our existence. Biological diversity is an important quality of landscape beauty. Many organisms--birds, large land mammals, and flowering plants, as well as many insects and ocean animals--are appreciated for their beauty. This appreciation of nature is ancient. Whatever other reasons Pleistocene people had for creating paintings in caves in France and Spain, their paintings of wildlife, done about 14,000 years ago, are beautiful. The paintings include species that have since become extinct, such as mastodons. Poetry, novels, plays, and sculpture often celebrate the beauty of nature. It is a very human quality to appreciate nature's beauty and a strong reason for the conservation of endangered species.

Moral justification

Moral justification is based on the belief that species have a moral right to exist, independent of our need for them. Consequently, the argument follows that in our role as global stewards, we are obligated to promote continued existence of species and to conserve biological diversity. This right to exist was stated in the U.N. General Assembly World Charter for Nature, 1982. The U.S. Endangered Species Act also includes statements concerning the rights of organisms to exist. Thus, a moral justification for the conservation of endangered species is part of the intent of law.

Moral justification has deep roots within human culture, religion, and society. Those who focus on cost-benefit analyses tend to downplay moral justification. However, although moral justification may not seem to have economic ramifications, in fact it does.

As more and more citizens of the world assert the validity of moral justification, more actions that have economic effects are taken to defend a moral position.

The moral justification has grown in popularity in recent decades, as indicated by increasing interest in the deep ecology movement. Arnee Naess, one of its principle philosophers, explains "The right of all the forms [of life] to live is a universal right which cannot be quantified. No single species of living being has more of this particular right to live and unfold than any other species."

Cultural Justification

Specific species, some threatened or endangered, are of great importance to many indigenous peoples, for whom diversity in forests and wildlife provides food, shelter, and tools, fuel, materials for clothing, and medicine. A reduction in biological diversity can increase the poverty of these people. For poor, indigenous people who depend on forests, there may be no reasonable replacement for these benefits except continual external assistance, which development projects are supposed to eliminate. Urban residents, too, share in the benefits of biological diversity, even if these benefits may not be apparent or may become apparent too late.

How People Cause Extinctions and Affect Biological Diversity

People have become an important cause of threatened and endangered species. The question: What causes extinction? has a number of answers. But before we turn to that subject, it is useful to view those processes against the ways people are influencing the persistence of many species.

Human actions cause extinction of species in several ways:

1. Through intentional hunting or harvesting (for commercial purposes, for sport, or to control a species that is considered a pest).
2. Through disruption or elimination of habitats.
3. Through introduction of exotic species, including new parasites, predators, or competitors of a native species.

4. Through pollution of the environment.

People have caused extinctions over a long time, not just in recent years. The earliest people probably caused extinctions through hunting. This practice continues, especially for specific products from animals considered valuable, such as elephant ivory and rhinoceros horns. When people learned to use fire, they began to change habitats over large areas. With the development of agriculture and the rise of civilization, rapid deforestation and other habitat changes became significant factors. Later, as people explored new areas, introductions of exotic species became an important cause of extinction, especially after Columbus's voyage to the New World and the spread of European civilization and technology. In the 20th century, with the introduction of thousands of chemicals into the environment, pollution has become an increasingly significant cause of extinction. Pollution control has proved to be a successful method to help species endangered by pollution. *All* bird species in the United States that were threatened with extinction by a specific pollutant have recovered when the pollutant was removed from their environment.

Modern civilization has contributed greatly to the increased rate of extinction. Tropical deforestation accounts for much of the increased rate. In recent years, the number of identified extinct species has increased significantly because of efforts to catalog species being lost. The current extinction rate among most groups of mammals is estimated to be 1,000 times greater than the extinction rate at the end of the Pleistocene epoch. Estimates today put the rate of extinctions worldwide as high as 50,000 species each year, resulting in a loss of 10% all species alive today within 25 years.

How a Species Becomes Endangered and Extinct

Extinction is the rule of nature. Local extinction occurs when a species disappears from a part of its range but persists elsewhere. Global extinction occurs when a species becomes extinct everywhere. Although extinction is the ultimate fate of all species, the rate of extinctions has varied greatly over geologic time and has increased rapidly since the

Industrial Revolution. From 580 million years ago until the beginning of the Industrial Revolution, on, average, about one species per year became extinct.

Over much of the history of life on Earth, the rate of evolution of new species equaled or slightly exceeded the rate of extinction. The average longevity of a species has been about 10 million years. However, the fossil record suggests that there have been periods of catastrophic losses of species and other periods of rapid evolution of new species which some refer to as "punctuated extinctions." About 250 million years ago a mass extinction occurred in which approximately 53% of marine animal species disappeared; about 65 million years ago, most of the dinosaurs became extinct. Interspersed with the episodes of mass extinctions, there seem to have been periods of hundreds of thousands of years with comparatively low rates of extinction.

Natural extinctions often appear to follow understandable patterns, with the replacement of one form by a more successful one through the process of competition and evolution. This was not the case, however, about 10,000 years ago, at the end of the last great continental glaciation. At that time, massive extinctions of large birds and mammals occurred: Smaller mammals were not so easily affected, nor were marine mammals. As early as 1876, Alfred Wallace, an English biological geographer, noted that “we live in a zoologically impoverished world, from which all of the hugest, and fiercest, and strangest forms have recently disappeared." It has been suggested that these sudden extinctions coincided with the arrival, on different continents, at different times, of Stone Age people and therefore may have been caused by hunting.

WRITE THE TIME HERE_____

PLEASE WRITE THE TIME HERE_____

Text Comprehension Test: BIOLOGICAL CONSERVATION

Recognition of Sentences

Here is a list of 26 sentences related to the text you have just read. A few of the sentences correspond word for word to the text. These sentences can be identified as **original sentences** taken verbatim from the text. In contrast, other sentences have been changed to a greater or lesser degree. These sentences are consistent with the content of the text (i.e. you will not find any incorrect assertions) but do not occur verbatim in it.

Please read each sentence carefully and circle YES in the left column if, in your opinion, the sentence occurred verbatim in the text. However, if you think a sentence has not been taken word for word from the text, even though it expresses the same idea in different words, then circle NO in the right column. If you are not sure about a sentence, do not spend a lot of time contemplating an answer. Just use your best judgment to make a spontaneous decision.

Please circle only one answer per sentence.

	Original sentence?	
01. Sudden extinctions were correlated with the appearance of Stone Age people.	YES	NO
02. The United Nations has recognized the obligation of humanity to protect nature in the U.N. General Assembly World Charter for Nature.	YES	NO
03. The discovery and use of fire was an early cause of extinctions by changing habitats over large areas.	YES	NO
04. The importation of exotic species can introduce new parasites, predators or competitors, which endanger native species.	YES	NO
05. Ecotourism is a growing source of income for many developing countries.	YES	NO
06. Bacteria can provide pollution control.	YES	NO

07. The Industrial Revolution greatly increased the rate of extinction. YES NO

08. It is important to know the reasons for conservation of endangered species. YES NO

09. The argument follows that in our role as global stewards, we are obligated to promote the continued existence of species and to conserve biological diversity. YES NO

10. Plant diversity is important because different species have different pollution control capabilities. YES NO

11. Animals that contract human diseases are often used in medical research. YES NO

12. The specific goals of conservation can be so different that conservationists often disagree about policy and action. YES NO

13. If conservation measures are not taken, plants that produce useful medical compounds may be destroyed and their uses never discovered. YES NO

14. Utilitarian justification is based on the consideration that many wild species might be useful to us. YES NO

15. Poisons produced by animals can be used to make medicines. YES NO

16. Decreasing biological diversity is one of the disadvantages of modern civilization. YES NO

17. The cave drawings in France and Spain provide a record of some of the animals living at the time. YES NO

18. Many organisms—birds, large land mammals, and flowering plants, as well as many insects and ocean animals—are appreciated for their beauty. YES NO

19. Global extinction occurs when a species becomes extinct everywhere. YES NO

20. Tropical rain forests are a good potential source for new crop species. YES NO

21. Biological conservation involves an integration of science and values. YES NO

22. Poetry, novels, plays, and sculpture often celebrate the beauty of nature. YES NO

CONTINUED ON THE NEXT PAGE

23. Arguments for biological diversity based on usefulness are more persuasive than those based on aesthetic or moral grounds. YES NO

24. In recent years, extinction has become more noticeable because there has been a greater effort to record the species that are disappearing than in the past. YES NO

25. Only a small fraction of the estimated 270,000 existing plant species are used for drugs. YES NO

26. Habitat loss is a major cause of extinction. YES NO

CONTINUED ON THE NEXT PAGE

True or False?

Below are 14 sentences that have **not** been taken verbatim from the text you have just read. They are either true or false statements about the text. According to the text, several of the sentences below are true. You will have to infer from the text which sentences these are. Other sentences are false, and they contradict statements made in the text.

Please read the sentences carefully. For each sentence, decide whether it is **true** or **false**. Then circle TRUE in the left column if, in your opinion, the sentence is true. However, if you think the sentence is false, circle FALSE in the column to the right. If you are unsure about a sentence, do not spend a lot of time contemplating an answer. Just use your best judgment to make a spontaneous decisions.

Please circle only one answer per sentence.

	According to the text	
01. The discovery of America by Columbus led to the exchange of previously unknown species between the Old and New World.	TRUE	FALSE
02. The rate of extinction of various species is beyond human control.	TRUE	FALSE
03. Consumers who are ecologically conscious vote with their dollars by supporting companies that are environmentally responsible.	TRUE	FALSE
04. Some bird species in the United States never recovered even after the pollutant that was endangering them was removed from their environment.	TRUE	FALSE
05. Many animals that Europeans brought with them to the New World are now endangered species.	TRUE	FALSE

06. Nitric oxide is a pollutant. TRUE FALSE

07. There is little likelihood that human beings will become extinct. TRUE FALSE

CONTINUED ON THE NEXT PAGE

08. Some species of plants and animals function as a form of cheap labor. TRUE FALSE

09. Ecotourism has become popular because it is an inexpensive way of traveling. TRUE FALSE

10. Tropical rain forests promote economic development in developing countries. TRUE FALSE

11. Stone Age people were successful hunters TRUE FALSE

12. Moral justification is one rationale for conservation that does not have any economic consequences. TRUE FALSE

13. The armadillo is the only animal known to contract leprosy. TRUE FALSE

14. Cultural diversity depends on biological conservation. TRUE FALSE

WRITE THE TIME HERE_____ AND TURN TO THE NEXT PAGE

Ordered Tree Task

Trial 1

Please arrange the following terms on the space provided starting with first space, so that concepts that are closely related in terms of their meaning in the biological conservation text passage will be close to each other. You may start with any term of the 16 given. Be sure to use all 16 terms.

mass extinction	hybrid crops	1._____
right to exist	pollution	2._____
landscape beauty	managed habitat	3._____
DNA preservation	medical research	4._____
		5._____
		6._____
		7._____
tourism	new products	8._____
cave paintings	deep ecology movement	9._____
deforestation	hunting	10._____
pollination	maintaining ecosystems	11._____
		12._____
		13._____
		14._____
		15._____
		16._____

TURN TO THE NEXT PAGE

Learning Strategies

The following questions ask about <u>what you did</u> to help you understand the passage that you read. **There are no right or wrong answers.** Please answer the questions as accurately as possible. **If you think the statement is very true of you, circle 7. If you think the statement is not at all true of you, circle 1. If the statement is more or less true of you, circle the number between 1 and 7 that best describes you.**

01. I tried to relate the text content to personal events or my experience while reading the passage.

1 2 3 4 5 6 7
not at all true very true of me

02. I tried to relate the text content to knowledge I already had about the topic.

1 2 3 4 5 6 7
not at all true very true of me

03. I tried to make up questions to help focus my reading.

1 2 3 4 5 6 7
not at all true very true of me

04. I tried to create mental images while reading the passage.

1 2 3 4 5 6 7
not at all true very true of me

05. I tried to produce my own thoughts and ideas while reading the passage.

1 2 3 4 5 6 7
not at all true very true of me

06. I tried to paraphrase the text in my own words while reading the passage.

1 2 3 4 5 6 7
not at all true very true of me

CONTINUED ON NEXT PAGE

07. I tried to organize the separate ideas in the text into clusters of related ideas (or "chunks").

1 2 3 4 5 6 7
not at all true very true of me

08. I tried to go over the material in my mind (or "rehearse" it) while I was reading the passage.

1 2 3 4 5 6 7
not at all true very true of me

09. When I was confused about something in the reading, I went back and tried to figure it out.

1 2 3 4 5 6 7
not at all true very true of me

10. I asked myself questions to make sure I understood the material I was reading.

1 2 3 4 5 6 7
not at all true very true of me

11. I thought about the essence and purpose of the text.

1 2 3 4 5 6 7
not at all true very true of me

12. I felt completely caught up in the text passage I was reading

1 2 3 4 5 6 7
not at all true very true of me

13. When reading the text, I felt like I was trying very hard to learn the material.

1 2 3 4 5 6 7
not at all true very true of me

14. When reading the text, I felt I was really concentrating.

1	2	3	4	5	6	7
not at all true						very true of me

CONTINUED ON NEXT PAGE

Activation

Each of the words below describes feelings or mood. Please use the rating scale next to each word to describe your feelings *at this moment*. Circle the number that best describes your feelings.

	Not at all	Slightly	Somewhat	Very much	Extremely
Energetic	1	2	3	4	5
Fearful	1	2	3	4	5
Active	1	2	3	4	5
Tense	1	2	3	4	5
Full-of-pep	1	2	3	4	5
Vigorous	1	2	3	4	5
Jittery	1	2	3	4	5
Intense	1	2	3	4	5
Clutched-up	1	2	3	4	5
Lively	1	2	3	4	5

TURN TO THE NEXT PAGE

Biographical Questions

1. Year in school? (circle one) Freshman Sophomore Junior Senior Other_____

2. Gender? (circle one) Female Male

3. What is your first language? (circle one) English Other_____

4. What is your intended major? _____

5. Please indicate the month, day and year in which you were born: ____/____/_____

6. How much did you know about the topic *before* you read today's text passage?

1 2 3 4 5 6 7

Very little Moderate amount A great deal

7. To what extent have you done outside reading that covered the material in the text passage?

1 2 3 4 5 6 7

Very little Moderate amount A great deal

TURN TO THE NEXT PAGE

My Reasons for Studying

The following questions ask about your attitudes toward your university courses. **Remember there are no right or wrong answers. Answer the questions as accurately as possible.** Use the scale below to answer the questions. If you think the statement is very true of you, **circle 7**; if a statement is not at all true of you, **circle 1** . If the statement is more or less true of you, **circle** the number between 1 and 7 that best describes you.

1 = not at all true of me	**2**	**3**	**4**	**5**	**7 = very true of me**

1. In my classes, I prefer course material that really challenges me so I can learn new things.	1	2	3	4	5	6	7
2. I think I will be able to use what I learn in my courses later in my life.	1	2	3	4	5	6	7
3. It is important for me to learn the material in my courses, not just get a good grade.	1	2	3	4	5	6	7
4. If I can, I want to get better grades in my classes than most of the other students.	1	2	3	4	5	6	7
5. I am very interested in the content area of most of my courses.	1	2	3	4	5	6	7
6. The most satisfying thing for me is to understand course content as thoroughly as possible.	1	2	3	4	5	6	7
7. I think the course material in most of my classes is useful for me to learn.	1	2	3	4	5	6	7
8. When I have the chance, I choose course assignments that I can learn from even if they don't guarantee a good grade.	1	2	3	4	5	6	7
9. I want to do well in my classes because it is important to show my ability to my family, friends, and to future employers.	1	2	3	4	5	6	7

TURN TO NEXT PAGE

Reasons For Participating

1. To what extent was reward/credit an **important** consideration in your completing the experiment?

1	2	3	4	5	6	7
Not at all important		Somewhat important		Very important		Extremely important

2. I thought the tasks were interesting. (circle one)

1	2	3	4	5	6	7
Not at all		Somewhat		Very much		Definitely

3. Since I was getting credit, I felt it was only fair to do all the tasks. (circle one)

1	2	3	4	5	6	7
Not at all		Somewhat		Very much		Definitely

4. I thought I might learn something. (circle one)

1	2	3	4	5	6	7
Not at all		Somewhat		Very much		Definitely

5. I wanted to help out the experimenter.(circle one)

1	2	3	4	5	6	7
Not at all		Somewhat		Very much		Definitely

6. I wanted to win the bonus money. (circle one)

1	2	3	4	5	6	7
Not at all		Somewhat		Very much		

Definitely

7. Would you be interested in learning more about the topic of the passage?"

1	2	3	4	5	6	7
Not at all			Somewhat			Very much

CONTINUED ON THE NEXT PAGE

8. Would you be willing to participate in another study similar to this one even if you would not receive any reward or credit for participation?

1	2	3	4	5	6	7
Not likely			Would consider it			Very likely

9. Please check each of the following courses that you have either completed or are now taking:

Completed	Taking this semester
_____ Environmental Issues	_____
_____ Introductory Anthropology	_____

WRITE THE TIME HERE_____

PLEASE PUT THE TEST BOOKLET IN THE TEST PACKET AND RETURN IT TO THE EXPERIMENTER!

Main Study Debriefing Statement

Thank you very much for helping us with this research project. The study you have just participated in examined different types of motivation for reading text passages; interest (intrinsic motivation) and reward (extrinsic motivation). Previous research has shown that interest in a topic (intrinsic motivation) can cause people to process text more deeply and to read more effectively. Research has also shown that extrinsic reward can decrease people's interest in activities, causing them to instead focus only on the reward. However, the effects of intrinsic versus extrinsic motivation on text comprehension have not been compared in the same study. This study attempts to find out whether offering an extrinsic reward for reading will reduce the person's interest in the topic and lead to changes in learning strategies.

Prior to this study, another study tested several different text passages in order to find readings that evoked high interest in some individuals and low interest in others. This was done in order to be able to assemble two groups of participants: one group who thought the text passage would be interesting and another group who thought it might be rather boring. Thus, the intrinsic motivation would differ among the participants.

In this study, participants were separated into two groups. One group was given the text passage and booklet as usual and given the instructions, along with an incentive (extrinsic motivation) to do well on the comprehension test. The other group was told that the computers were not working, but they would automatically receive credit anyway. However, this group was asked to perform in another study for no reward. By doing this, the extrinsic motivation was reduced for the second group. The interest form you were given before and after reading the text passage measures the intrinsic motivation. The other sets of questions measure strategies and characteristics of text processing.

Please do not discuss this study with other people who may serve as participants in the future. If you do this, the study will be seriously compromised.

If you would like to learn more about this area of research, the following references will be helpful.

Lepper, M. R., & Henderlong, J. (2000). Turning "Play" into "Work" and "Work" into "Play": 25 Years of Research on Intrinsic Versus Extrinsic Motivation.

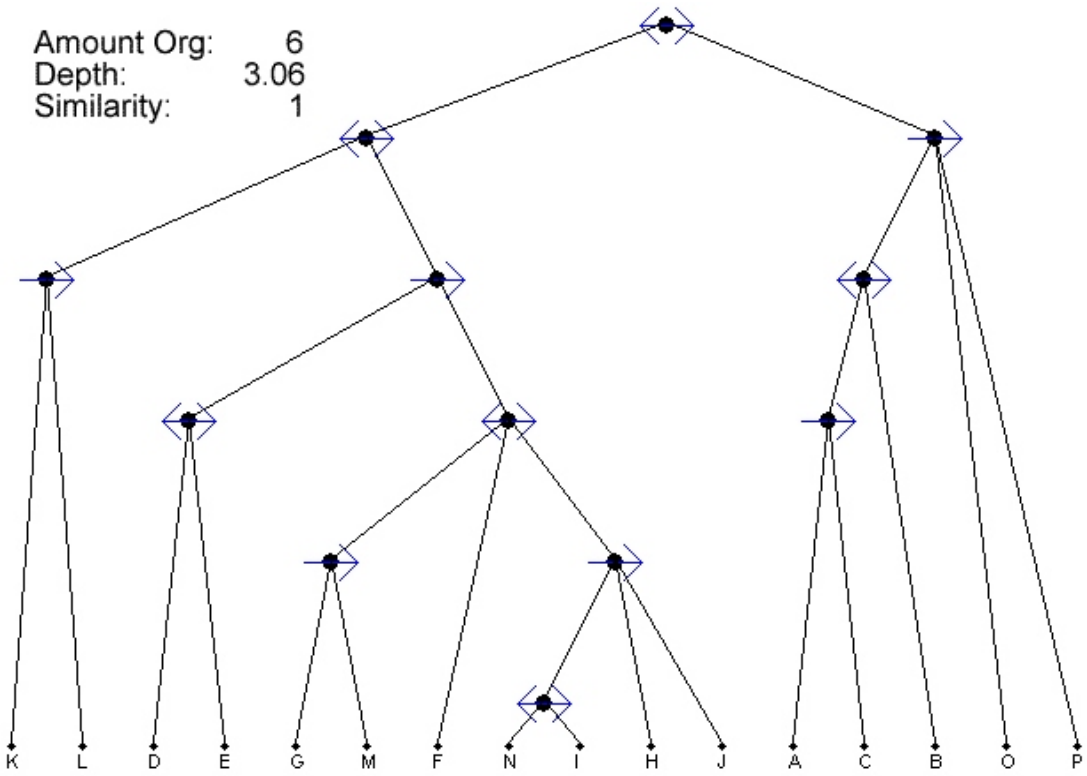
Sansone, Carol & Harackiewicz, Judith M. (Eds.), *Intrinsic and Extrinsic Motivation: The search for optimal motivation and performance. 10*, 257-307.

Schiefele, U. (2001). The role of interest in motivation and learning.

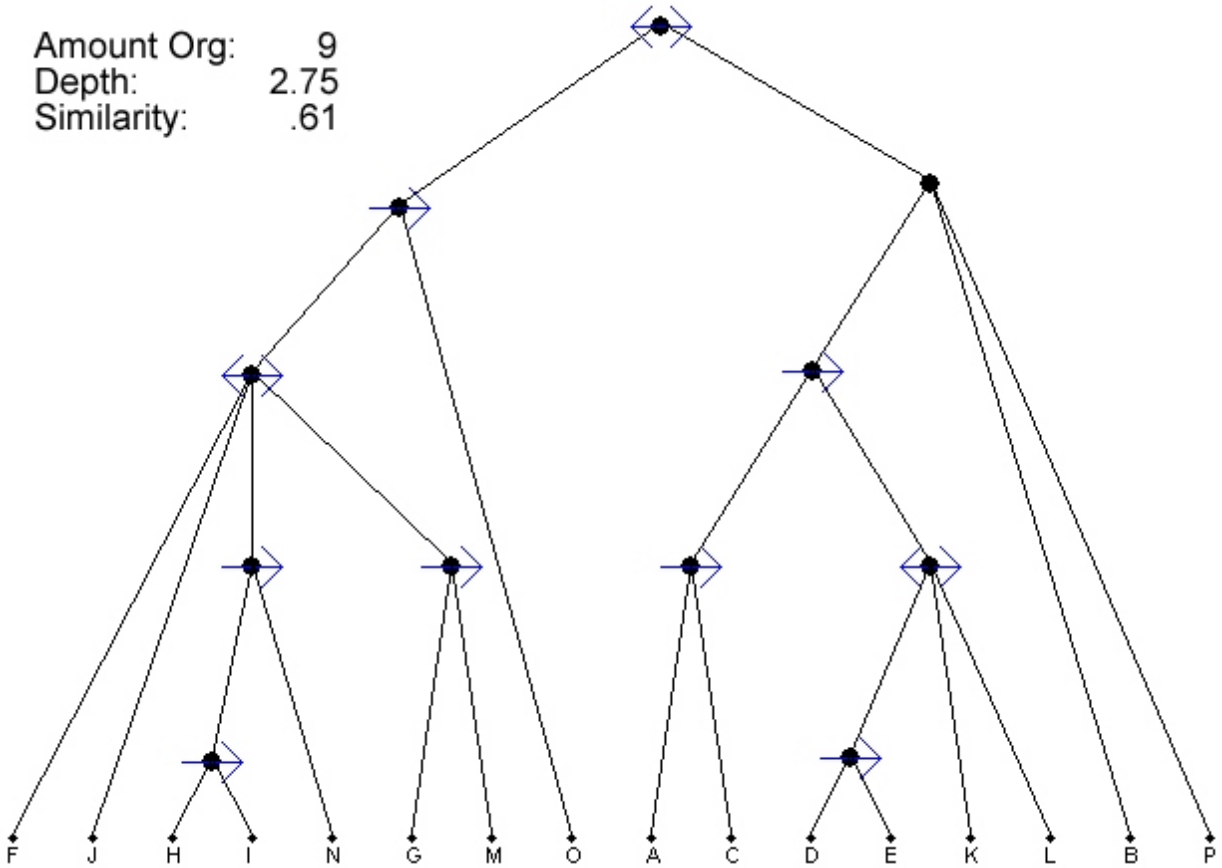
If you would like more information about this project, please feel free to contact Michael Landau at mlandau@uga.edu. Once again, thank you very much for help.

APPENDIX M

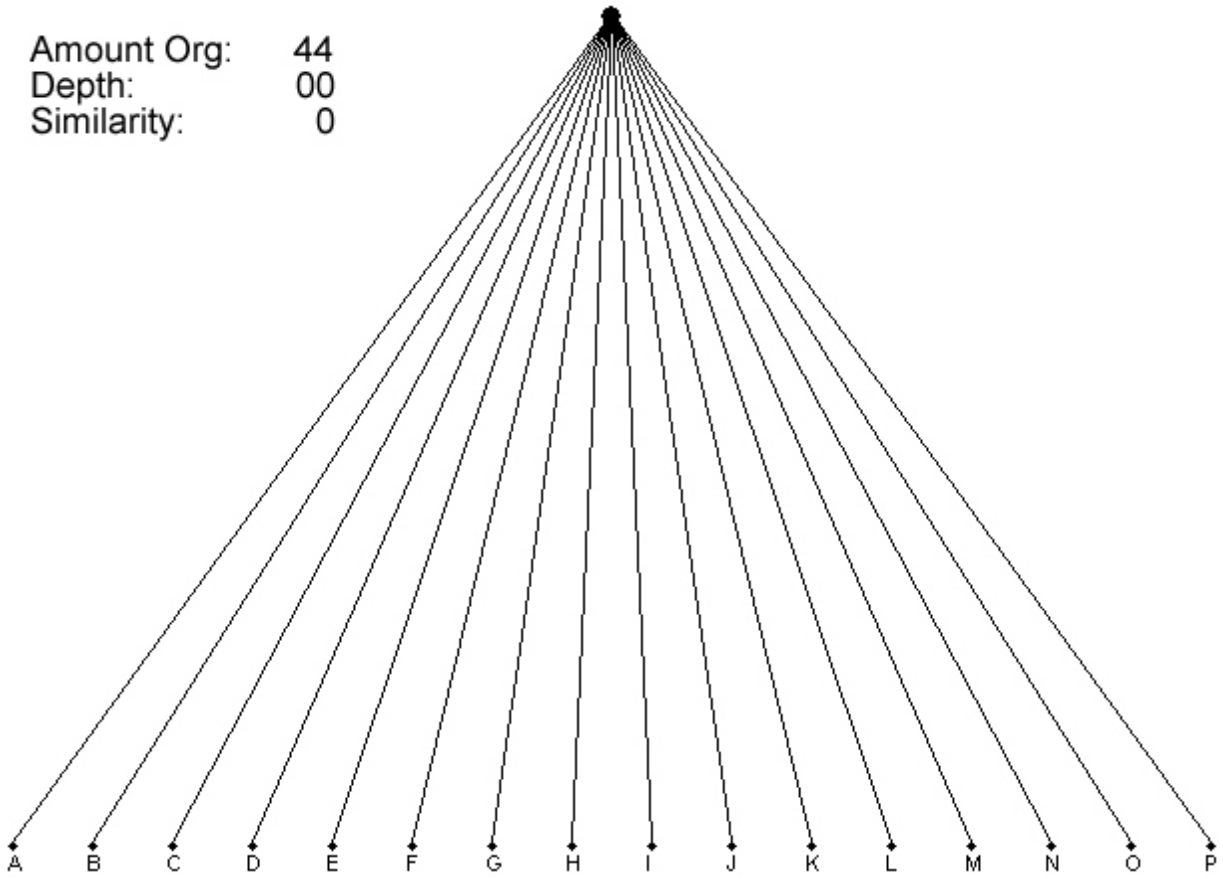
OTT Tree Diagrams



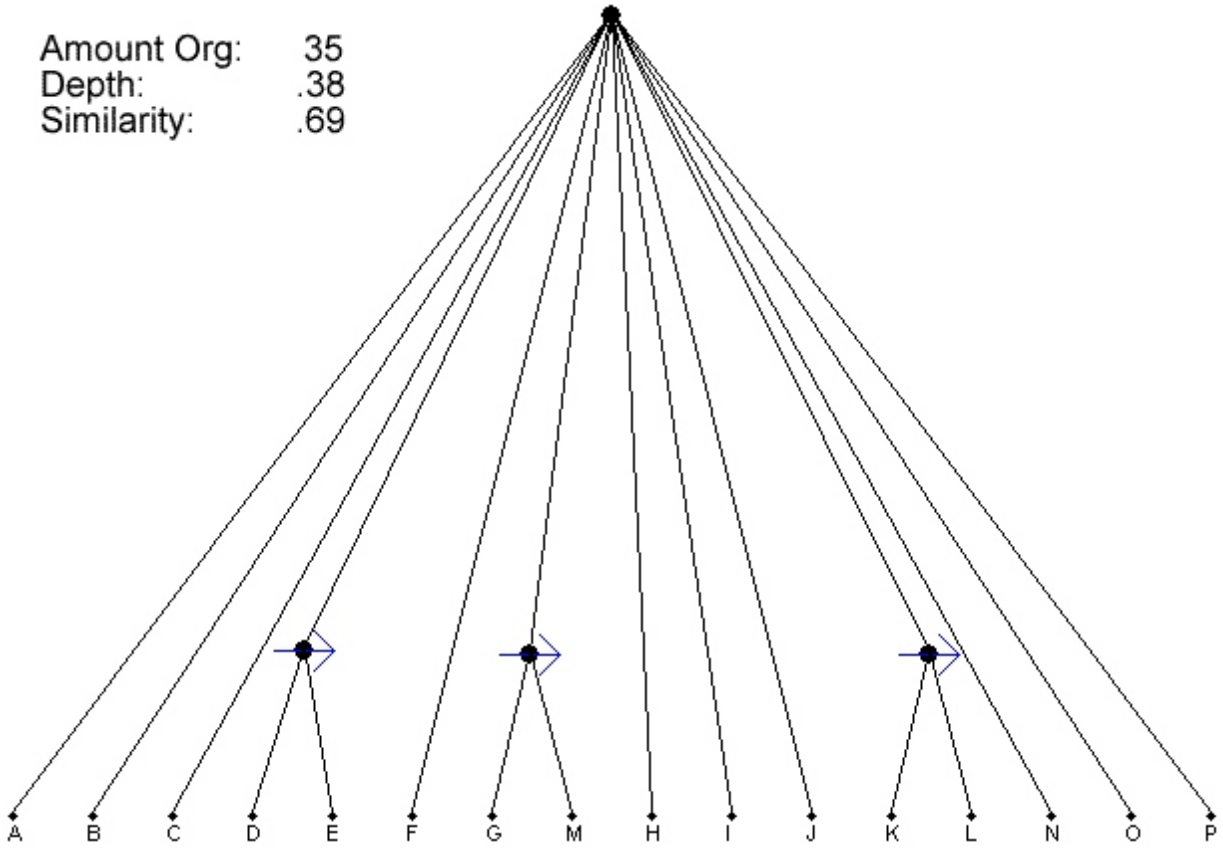
Expert OTT Diagram high amount organization and high depth



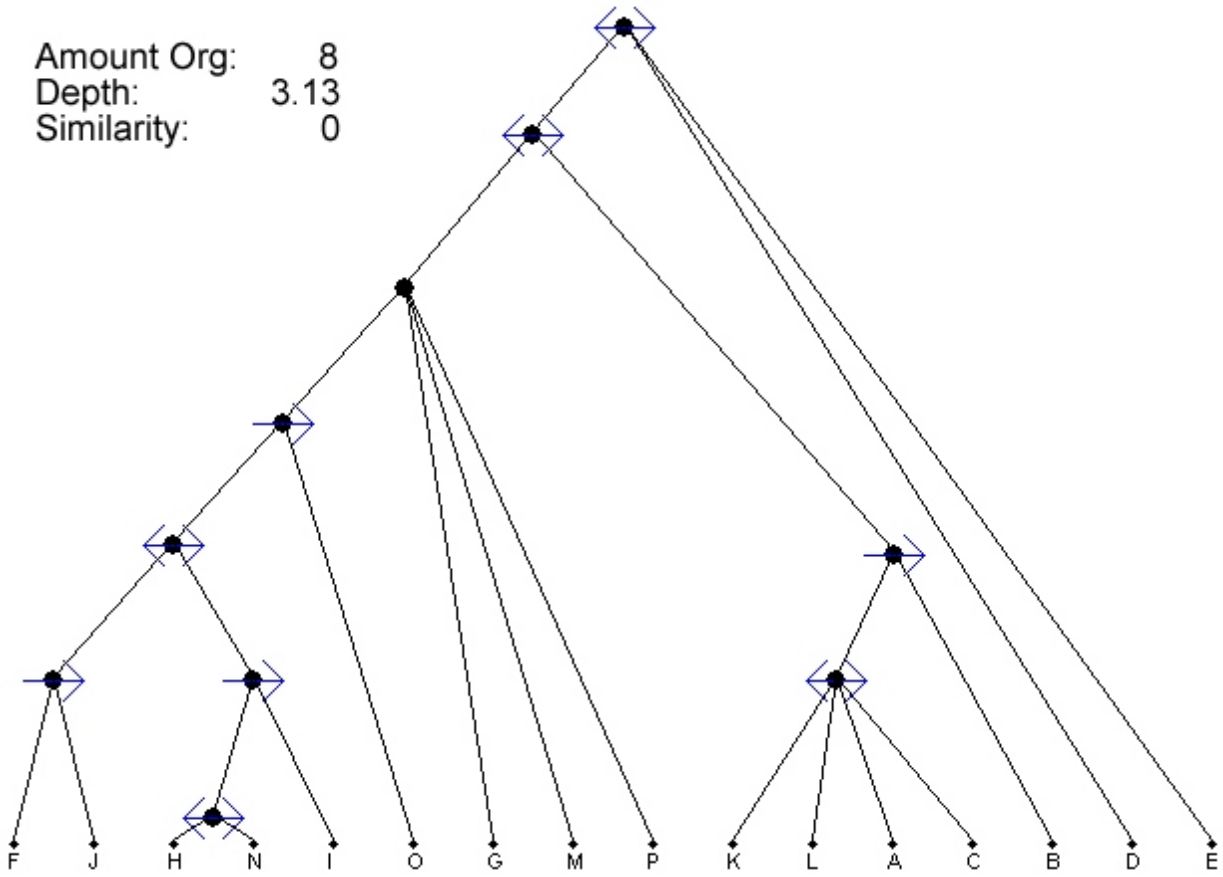
Student A. High amount organization, high depth, high similarity to expert



Student B low amount organization, low depth, low similarity to expert



Student C low amount organization, low depth, high similarity to expert



Student D high amount organization, high depth, low similarity to expert