

How deep is the meaning of life?

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Subjects viewed a series of color slides of natural outdoor scenes under one of three instructions: (1) One group was given a standard intentional learning instruction (a "deep" task). (2) Another group estimated the percentage of the slide taken up by sky (a "shallow" task). (3) A third group contemplated the meaning of life while viewing the slides. Approximately 1 h later, all subjects took a yes-no recognition test. The meaning-of-life and the intention-to-learn instructions both resulted in better subsequent recognition than did the shallow processing task, but the former two groups did not differ. These results indicate that the meaning of life is relatively deep.

There is now ample evidence to indicate that the type of processing given to a stimulus influences later recall and recognition of that stimulus. Much of this work was motivated by the theoretical ideas in an important paper by Craik and Lockhart (1972). For example, Craik and Tulving (1975) asked subjects to answer questions about a series of words (e.g., the word "table"); later, the subjects were given an unexpected recognition test for all the words. The questions that involved shallow levels of processing, such as questions about the case of the letters, led to poorer recognition than questions that involved deep levels of processing, such as questions about the meaning of the word. One conclusion from studies such as these has been that memory performance increases as depth of processing increases, a conclusion that has been attacked on the grounds that it is scientifically empty because of problems encountered in identifying particular encoding activities with theoretical levels of processing (Baddeley, 1978; Nelson, 1977; Postman, 1975).

Despite the difficulties with the depth notion, one thing is clear: Different kinds of processing yield different memory performance. One can legitimately ask whether any given type of processing is likely to lead to good memory performance (in which case, for convenience, we shall classify it as a "deep" task) or poor memory performance (in which case, we shall classify it as a "shallow" task).

The present experiment explored a heretofore unstudied processing task. Subjects viewed a series of slides of mountains and other outdoor scenes under one

of three processing instructions. One task, the instruction to try to remember, was known to lead to reasonably good performance, and it was thus dubbed a "deep" task. Another task required the subject to judge the percent of the slide taken up by the sky. Because it emphasizes superficial visual features in the stimulus (cf. Bower & Karlin, 1974), the second task was expected to lead to relatively poor memory performance, and thus it was dubbed a "shallow" task. The new task introduced in this research was an instruction to the subjects that while they viewed the slides they should contemplate the meaning of life. If contemplation of the meaning of life distracts people from paying attention to the slides, poor memory performance will result, and the task should be classified as "shallow." On the other hand, if contemplation of the meaning of life causes people to more fully process the information in the slides, pay better attention, and do more elaborative rehearsal, then good memory performance will result, and the task should be classified as "deep." Thus, the purpose of the present study was to answer the question, "How deep is the meaning of life?"

METHOD

Subjects were 36 students at the University of Washington who participated in the study in exchange for course credit. All were tested individually. One-third of the subjects were assigned to each of the three processing tasks.

During the study phase of the experiment, subjects saw a series of nine color slides that depicted nature scenes. Most of the pictures were taken at Mount Rainier National Park and included a view of Mount Rainier; others were taken at the Grand Canyon. Figure 1 is a black-and-white version of one of the slides and is included to show a typical slide.

The slides were presented in random order to each subject, and each slide was shown for 5 sec. Subjects in the intentional learning condition heard these instructions before viewing the slides: "I am going to show you a series of slides which are

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Figure 1. A black-and-white copy of one of the color slides that was included in the series shown to subjects.

photographs of scenery. Please study the slides carefully. Later I will show you the same slides mixed up with similar slides and will ask you to tell me which ones you have seen before." Subjects in the percentage-of-sky condition heard these instructions: "In taking pictures of scenery, many photographers are concerned with how much of the picture is taken up by the sky. The purpose of this study is to better understand the role of the sky in pictures of scenery. I am now going to show you a series of slides." Subjects who were asked to contemplate the "meaning of life" while viewing the slides heard these instructions: "Advocates concerned with preserving the wilderness argue that one of its benefits is that looking at wilderness scenery provokes people to ponder the meaning of life. The purpose of this study is to better understand this process. I am now going to show you a series of slides; as you see each slide, look at it and use it as a starting place for thinking about the question, 'What is the meaning of life?' Afterwards, we will ask you to tell us about your response to these pictures."

After the slides were presented, subjects in the shallow processing and meaning-of-life conditions completed short questionnaires. The former gave a single percentage to indicate their estimate of the average area taken up by the sky in the slides they had viewed; the latter chose a number on a scale from 1 to 10 to indicate how successful the pictures were in making them ponder the meaning of life (1 = unsuccessful, 10 = very successful).

Following a 45-min unrelated filler activity, subjects participated in a yes-no recognition test. They saw 18 slides; half had been presented before, and half were new but depicted similar scenes from the same two locales. The slides were presented in one order to all subjects, who were asked to indicate whether they had seen each slide during the study phase of the experiment. Subjects were given as much time as needed to make each response.

RESULTS

The mean number of recognition errors is shown in Table 1. Subjects who judged the percentage of sky made twice as many errors as subjects who were given an

Table 1
Mean Recognition Errors as a Function of Type of Judgment

	Total Errors	False Alarms	Misses
Percentage of Sky	4.16	1.83	2.33
Intention to Learn	2.08	1.00	1.08
Meaning of Life	1.75	1.08	.67

intention to learn. Those who contemplated the meaning of life made at least as few errors as subjects who intended to learn.

A one-way analysis of variance on the error scores yielded a significant outcome [$F(2,33) = 8.61, p < .01, MSe = 2.39$]. The Newman-Keuls test showed that the shallow judgment led to significantly poorer recognition than did the other two processing activities, and the latter two did not differ from each other ($p < .05$).

Additional analyses may be of interest. The types of errors made by the various groups differed. The meaning-of-life subjects tended to make more false alarms than misses, whereas for the shallow processing subjects, the reverse was true (see Table 1). Also, recall that the meaning-of-life subjects indicated how successfully the pictures made them ponder the meaning of life. These scores were correlated with recognition performance. Contrary to our expectations, subjects who indicated the pictures were successful at making them ponder the meaning of life did not necessarily recognize those pictures better than did subjects who indicated the pictures were not successful ($p > .10$).

DISCUSSION

The present experiments showed that subjects who are asked to think about the meaning of life while viewing natural scenes perform reasonably well on a subsequent test of their memory for those scenes. In depth-of-processing terminology, the meaning of life was found to be deep.

Exactly what subjects do when they view a picture while contemplating the meaning of life is still unknown. One possibility is that they relate the specific picture to some personal experience, self-reference being one activity known from prior research to lead to good subsequent memory performance (Mueller, Courtois, & Bailis, Note 1). Another intriguing possibility is that the contemplation of the meaning of life produces some sort of altered state of consciousness during which people are particularly adept at processing environmental stimuli. However, no existing literature addresses this possibility.

These results supplement an accumulation of findings, all of which point to the fact that different kinds of processing result in differential memory performance. In this regard, people's recall is better for words that they earlier rated for pleasantness than for words in which they detected a particular letter (Hyde & Jenkins, 1973). People who judge the honesty or intelligence of faces recognize photographs of those faces better than other subjects who simply make a decision about the gender or weight of the person depicted in the photograph (Bower & Karlin,

1974). People who look at two naturalistic scenes while trying to decide which of the two scenes is in the United States remember them better than people who view the scenes and select the more colorful (Miller, Mueller, Goldstein, & Potter, 1978). And, in one ambitious comparison of recognition memory following nine different kinds of judgments, it was found, among other things, that people who judge whether a person looks like a businessman recognize better than those who judge whether the person has a big nose (Winograd, 1976).

The present research adds information about a new processing activity to this fast-accumulating literature. The determination of additional processing activities and their effects on subsequent memory performance awaits the outcome of future research. One study currently being planned involves presenting subjects slides of fish under one of several conditions. One group will look at the fish while contemplating the various oceans of the world. The question to which this study is addressed should be obvious.

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