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The Effect of Mood on Picture Recognition

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Picture recognition has been intensively studied in attempts to understand how objects are perceived and re-perceived. Many studies have shown that humans have an exceptional memory for discriminating between those pictures that have and have not been seen before (Pezdek, 1987). Consequently, many approaches have been taken to understand visual recognition. However, studies have failed to examine the effects of mood on picture recognition. Three theories that can provide an understanding on whether mood plays a role in recognizing pictures are the, Mood Congruence Theory, Mood Dependence Theory, and the Pollyanna Principle. This review is designed to examine the work done in these three areas of research in attempts to understand the implications on picture memory.

Picture Memory:

Studies done by Pezdek (1987), & Pezdek & Maki (1998) have illustrated that subjects who are presented simple and complex pictures, and then given a recognition test, are easily able to identify new pictures (not previously seen) from pictures already shown. The human memory for pictures appears to increase as the exposure duration increases. This implies that longer exposure duration allows more information about the details in the picture to be encoded and retained at longer intervals. This is supported by Rybak et al. (1998) study, that making more eye fixations generally occurs more often in areas of high information density. This study illustrates that when studying picture memory, it is important to maintain a reasonable time exposure of each picture in order to

avoid a ceiling effect.

Mood Congruence Theory:

Effects of mood can be studied using mood induction techniques, such as viewing emotional films, or Velten's (1968) procedure, where subjects are asked to read a series of mood-suggestive statements, and then try to experience that mood. The majority of related work has studied memory for material, which is mood congruent or incongruent.

The Mood Congruence Theory states that people are more likely to remember information that congruent with their own mood-state at the time of learning. The mood congruency theory predicts that subjects induced into a happy mood should learn pleasant material better than unpleasant material whereas, subjects induced into a sad mood should learn unpleasant material better than pleasant material.

A study done by Hesse et al. (1997) has shown that the inducement of a specific emotion may facilitate solving anagrams similar in mood. To illustrate, a subject in a happy mood, given the following two anagrams to solve, asfatncit (fantastic) and ersmialeb (miserable), would be more likely to solve the anagram fantastic since it is a pleasurable word, consistent with the subject's mood. This study therefore supports the mood congruence theory.

A study (Bower 1981, in Parkin 1993) testing the mood congruence theory asked subjects to keep a diary of the emotional aspects of their lives. After one week, they were subjected to a mood induction procedure using

hypnotic suggestion to feel either happy or sad. Subjects were then asked to recall recent events. Results showed that subjects induced in a happy mood recalled more pleasant memories and those in an unhappy mood recalled more unpleasant memories, therefore illustrating a mood congruency effect.

Morel (1991) examined the effect of mood induction on the recognition memory of word types. Subjects were induced into a happy or sad mood and then presented emotionally pleasant words on a computer screen. Twenty-four hours later, either the same or opposite mood was induced before presenting words of exact match, mood match and mood opposite words. Results showed that subjects in the mood-congruent condition had faster reaction times than subjects in the mood-noncongruent condition. Therefore induced mood bore some relationship to speed but there was no effect found on the accuracy of recognition.

A study using hypnotic suggestion to induce mood (Bower, Gilligan and Monteiro 1978, in Jahnke & Nowaczyk, 1998) put the Mood Congruency Theory to test. Subjects were induced first induced into a happy or sad mood. Subjects were then required to read a story entailing two characters, one was happy and the other was sad. After reading the story subjects were questioned, which character they identified with and who the main character was the happy or sad individual? Results supporting the Mood Congruence Theory showed that those subjects whose induced mood was happiness identified with the happy character and thought he was the main character since there were more statements about

him. Subjects induced in a sad mood as well identified with the sad individual, thinking that he was the main the character since the story contained more statements about him. In reality there was an equal amount of statements referring to each character, therefore illustrating the mood-congruity effect.

Mood Dependence Theory:

The Mood Dependence Theory states that your recall when you are in a particular mood depends partly on your mood when you originally learned the material. The important variable is not the emotional nature of the material, but whether the mood during encoding matches the mood during recall. Therefore the same mood at the time of the memory test should provide a contextual cue and facilitate the retrieval of the to be remembered material.

A study examining memory performance tested individuals in two distinct environments, on land and under water (Godden & Baddeley 1975, in Parkin 1993). It was found that free recall was better when the learning and the test environments were the same than when they were different. However, there was no evidence of a state-dependent memory when a recognition test was used.

A study testing recall was done using subjects who engaged in a learning task after consuming either a soft drink or a substantial amount of vodka (Goodwin et al. 1969, in Parkin 1993). The next day subjects were required to perform the same task again, either in the same state or a different state. A change in state produced reliably lower recall performance. It is important to examine the role of learning in different environments therefore taking into

consideration the effects of the mood dependence theory on memory.

Other studies have examined the role of mood-state in learning. Philpot and Madonna (1993) investigated whether learning and retrieval were associated with changes in mood-state. Using the Velten (1968) procedure, subjects were induced into a specific mood and exposed to a serial-learning task and a recall trial, followed by a digit-symbol task. It was found that recall was significantly greater in the Happy-Happy and Sad-Sad groups. Findings for the Neutral-Neutral group were mixed. Therefore, it can be said that that this study supports the concept of context-related, mood-state-dependent recall.

Some studies testing the mood dependence theory have found opposing results indicating that mood does not always influence what type of information is retrieved in a re-testing condition. To illustrate, (Bower & Mayer 1985, in Matlin, 1994) participants were hypnotized in either a sad or happy mood by having them recall a happy/sad event from their life. In the first mood inducing procedure, subjects heard a list of English words. A second mood state (either happy or sad) was then induced, and subjects heard a second list of English words. After a break, subjects were induced into a third mood (happy or sad) and then asked to recall the words from each of the lists. Results showed that subjects recalled 57 percent of the material in the conditions where encoding matched recall mood and 56 percent in conditions where the moods did not match, therefore showing no significant effects that would support the mood dependence theory.

The cause of inconsistent findings has been attributed to the techniques used to induce mood (Parkin,1993). Perhaps ineffective mood inducing techniques leads to non-induced subjects therefore producing insignificant results.

The Pollyanna Principle:

The Pollyanna Principle states that pleasant items are usually processed more efficiently and may be stored more accessibly in memory than less pleasant items (Matlin, 1994). This implies that mood type is irrelevant and rather, learning is dependent on whether the material is pleasant or unpleasant.

Ellis et al. (1997) found that positive mood facilitates recall of congruent material and a negative mood seems to inhibit recall from memory of both congruent and incongruent stimuli. These findings support the Pollyanna Principle illustrating that positive material is better recognized and more efficiently processed.

Visual recognition is a complex program influenced by many factors. The perception of an image can depend on the type of information present such as colour, pattern or even the type of emotion expressed. Recognition memory has been examined by methods using learning tasks or solving problems such as anagrams. The theories discussed, attempt to identify relations between certain factors such as mood, or pleasant material, with the probability of remembering information. However, how does mood play a role in the process of visual information? When we view novel scenes, can we attribute our mood or

the pleasantness of a visual image, to the likelihood of later recognizing that picture? Perhaps further research could examine the effect of emotion on picture memory.

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Thesis Proposal

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Abstract

This research examined the effects of induced mood on picture recognition. Seventy-five Algoma University students were induced into a happy, neutral or sad mood using a mood induction strategy similar to the one devised by Velten (1968). In completion of this mood inducing task, subjects were then presented 60 pictures of faces (20 happy, 20 neutral, and 20 sad) at a rate of 0.5 seconds each. Following the picture presentation, participants completed a mood adjective checklist to test the effectiveness of the mood inducing procedure. Subjects then identified out of a second set of 93 pictures, which images they had seen earlier. Results showed that the mood inducing procedure had an insignificant effect on subject's mood, however happy pictures were better recognized across all three mood groups, than neutral and sad pictures.

Introduction

The mood congruence theory states that people are more likely to remember information that is congruent with their own mood-state at the time of learning. Two methods in studying mood congruence are to either study people who differ from each other in general mood, or manipulating people's mood, which is the strategy used in this study.

The mood state dependence theory states that your recall when you are in a particular mood depends partly on your mood when you originally learned the material. The important variable is not the emotional nature of the material, but whether the mood during encoding matches the mood during recall. Therefore the same mood at the time of the memory test should provide a contextual cue and facilitate the retrieval of the to be remembered material.

The Pollyanna Principle states that pleasant items are usually processed more efficiently and may be stored more accessibly in memory than less pleasant items (Matlin, 1994).

Mood Congruence Theory:

Results from a variety of studies supporting the Mood Congruence Theory have shown that the inducement of a specific emotion facilitates solving anagrams similar in mood (Hesse, Friedrich, Kauer, Gerald, Spies and Kordelia, 1997). Similar findings from Blaney (1986, in Matlin 1994) have shown that depressed people tend to recall more negative material, whereas non-depressed subjects recall more positive material.

A study using hypnotic suggestion to induce mood (Bower, Gilligan and Monteiro 1978, in Jahnke & Nowaczyk, 1998) put the Mood Congruency Theory to test. Subjects were induced first induced into a happy or sad mood. Subjects were then required to read a story entailing two characters, one was happy and the other was sad. After reading the story subjects were questioned, which character they identified with and who the main character was the happy or sad individual? Results supporting the Mood Congruence Theory showed that those subjects whose induced mood was happiness identified with the happy character and thought he was the main character since there were more statements about him. Subjects induced in a sad mood as well identified with the sad individual, thinking that he was the main the character since the story contained more

statements about him. In reality there was an equal amount of statements referring to each character, therefore illustrating the mood-congruity effect.

Mood Dependence Theory:

Bower (1981, in Payne & Wegner, 1998) suggests that emotions are units, or nodes in a network. These nodes become connected to other units in a network which represent non-emotional events. When an emotion node is activated it may activate other units in the network, therefore creating what we call a mood-state dependence.

Recent research has shown that memory deficit in depression is evident. Mood dependent memory effects can reliably be obtained under three conditions. Subjects must experience strong and stable states of the mood of interest; be actively involved in generating the material to be remembered; and be actively involved in producing the cues at retrieval.

Claudia Vcros (1989, in Matlin 1994) has shown a moderately strong relationship between matching mood states and amount of material recalled. A number of variables influenced the strength of that relationship. Mood state dependence was especially likely to operate if the stimulus material was real life events, rather than material such as sentences constructed by the researchers.

Studies done by Mower, Monteiro and Gilligan (1978, in Payne & Wenger 1998) & Weingardner, Miller & Murphy (1977, in Payne & Wenger 1998) appeared to demonstrate that, in both naturally occuring and experimentally induced depression, memory performance suffered. Later research concluded that memory performance was a function of emotional conditions at encoding (Blaney 1986, in Matlin 1994).

Pollyanna Principle:

Most work using mood induction has demonstrated that positive mood facilitates recall of congruent material and a negative mood seems to inhibit recall from memory of both congruent and incongruent stimuli (Ellis, Thomas, McFarland, 1997). These findings are consistent with the Pollyanna Principle.

This experiment seeks to determine whether current mood influences memory for faces depicting congruent and non-congruent moods. The Mood Congruence Theory predicts that those subjects whose mood is for example sad, will have a better chance recognizing pictures that are as well sad. The Mood Dependence Theory predicts that the emotional nature of the pictures does not matter, recognition rather is dependent on whether the mood during encoding is the same during recognition. The Pollyanna Theory however suggests that the type of mood induced is irrelevant, and that the happy pictures will be best remembered since happy items are processed most efficiently. It is hypothesized that pleasurable faces will have the greatest chance of being recognized. The results should illustrate that the induction of a specific mood is irrelevant when viewing pleasurable pictures, therefore supporting Ellis et al. (1997) work.

Method
Participants: Seventy-five undergraduates from Algoma University were randomly assigned to one of three conditions, happy, neutral or sad.

Apparatus: A total of 123 pictures were displayed on a computer monitor. These images consisted of happy, neutral and sad faces. They were collected from a variety of sources such as magazines, and encyclopedias.

Procedure:

A computer lab consisting of seven computers was used to conduct this entire experiment.

Subjects first engaged in a mood induction task using a technique similar to the one devised by Velten (1968). Subjects were instructed to read a series of statements, and then try to experience the emotion expressed.

Happy subjects read statements progressing from mildly happy such as, 'Life is good' to extremely euphoric such as, 'God I feel great'. Similarly, the sadly induced subjects read statements progressing from mildly sad such as, 'I wish things could be easier' to extremely depressing such as, 'The world is closing in on me'. The neutral group read factual statements that did not express any sort of emotion, for example, 'Humans are 98% genetically identical to chimpanzees.'

After completing the mood induction procedure, subjects read instructions requesting them to carefully view a set of pictures. Sixty pictures were flashed at a rate of 0.5 seconds each, with a 0.5 second interval between each picture.

Following the picture presentation, a Mood Adjective Checklist was displayed on the computer screen. Subjects were instructed to click on the five words that best described their present mood. The checklist consisted of twenty-five words that were mildly happy, extremely happy, mildly sad, extremely sad and neutral. This checklist was administered to each participant to ensure that the mood according to the condition had been induced. After the checklist was displayed, participants were then shown a second set of 93 pictures. Sixty-three of the pictures were novel and thirty of the pictures had previously been shown in the first set. Ten pictures were taken from each mood theme. Participants were requested to respond for each picture, either yes or no, if they had seen the picture earlier (in the first picture presentation).

Results and Discussion

To assess the effectiveness of the mood inducing procedure, subjects were scored on the five words they chose, on a scale ranging from -2 to +2. Subjects who chose the following words obtained a score of, +2 for extremely happy words, +1 for mildly happy words, 0 for neutral words, -1 for mildly sad words, and -2 for and extremely sad words. The mean score for each mood group was calculated. The mood inducing procedure was to be considered effective if, subjects in the happy group obtained a mean score between +5 and +10, subjects in the neutral group obtained an average score between -2 and 2, and if subjects in the sadly induced mood received a mean score between -5 and -10. Results showed that the happy group received a mean score of 2.12, the neutral group obtained a score of 1.04, and the sadly induced group received an average score of 0.25. These results indicate that overall the mood inducing procedure had little or no effect in inducing the mood assigned to the subject.

Subjects in each mood group were compared to determine which type of pictures they were most likely to recognize (happy, neutral, or sad), and which pictures they were least likely to recognize. An analysis of variance for data indicated no significant effect between the type of mood induced and the number of hits and misses (P-value of 0.076).

A significant effect however, was found between the picture type (happy, neutral and sad) and the hits and misses (P-value of 0.000). Happy pictures were recognized better than pictures that were either neutral or sad.

Subjects induced into a happy mood recognized 81% of the happy pictures, 75% of the neutral pictures, and 66% of the sad pictures. Subjects induced in a neutral mood recognized 72% of the happy pictures, 69% of the neutral pictures, and 58% of the sad pictures. Subjects induced in a sad mood recognized 73% of the happy pictures, 70% of the neutral pictures, and 62% of the sad pictures. The three groups were also compared on the types of pictures they failed to recognize. The group induced in a happy mood did not recognize 19% of the happy pictures, 25% of the neutral pictures, and 34% of the sad pictures. Subjects induced in a neutral mood did not recognize 28% of the happy pictures, 31% of the neutral pictures, and 42% of the sad pictures. Finally, subjects induced in a sad mood did not recognize 27% of the happy pictures, 30% of the neutral pictures, and 38% of the sad pictures.

These percentages show that on average, subjects induced in a happy mood recognized the highest number of pictures. The sad group has shown to identify more pictures than the neutral group, which is inconsistent with studies claiming that depressed mood produces memory deficits. These results also indicate that happy pictures had the highest chance of being recognized. This finding is consistent with the Pollyanna Principle, that happy items will be better remembered than neutral or sad ones, despite mood, however, because the mood inducing procedure was shown to be ineffective, these results cannot support this theory.

It is unfortunate that the mood inducing procedure in this study did not have a significant effect on subjects. It is recommended that further study on the effect of mood on recognition or recall tasks, should use stronger methods to induce a specific mood. It is also suggested that more studies be done testing the Pollyanna Principle since research in this area is extremely limited.

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