Mood Induction

through Exposure to Facial Expression

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Abstract

Mood induction procedures are often used in investigating the role of affect in cognitive processes. The methods of mood induction currently being used have been subjected to various criticisms. This study attempted to demonstrate a mood congruency effect using an alternative method of mood induction. One hundred and twenty university students were tested for recall of positive, negative, or neutral affectively valenced words which had been paired with pictures of happy, sad, or neutral facial expressions on male and female models. A main effect was found for Word Type ($p < .01$) and two way interactions were found for Model Gender x Word Type ($p < .05$) and Model Gender x Expression Type ($p < .05$). Analysis of the distribution of errors based on word type demonstrated significant results when the paired model expression was positive and negative ($p < .05$), but failed to reach significance when the paired expression was neutral. The results provided qualified support for the use of exposure to facial expression as an alternative method of mood induction. The implications of these findings for future research methodology are discussed.

In recent years a great deal of research has focused on the relationship between mood and memory. This type of research was generated in response to a recognized need for greater acceptance of affect as an important component in the human information processing system. Although the importance of personal variables such as self concept and emotion have been emphasized (Markus, 1983; Neilsen & Sarason, 1981; Rogers, 1980) their integration into an information processing model is an ambitious and challenging endeavor. It involves the introduction of an enigmatic variable, emotion, into an already complicated research area. This research attempts to further develop the technology necessary to study the role of emotion in information processing.

Issues in Cognitive Processing

A review of cognitive literature by Nisbett and Wilson (1977) suggested that subjects may be aware of only the product of cognitive processes and not the process itself. Given the limited access to the underlying cognitive processes, current research addressing the influence of mood on thought has used the products of memory as a source of information while making inferences about the actual processes involved.

The network theory is the current popular model researchers have been using to explain the processes involved in memory (Bower, 1981). The theory describes memory as an associative network of concepts and schemata. These sets of information elements or "nodes" form a large interrelated organization. Information or memory events represented by these nodes are connected via

associative pathways to various other nodes. When in use, these nodes are said to be activated. Activation involves the excitation of a node such that it reaches a critical threshold and the person becomes consciously aware of the information represented by that node (Bower, 1981).

An activated node tends to spread this excitation to other nodes with which it shares associative pathways. This spreading of excitation results in a lowering of the critical threshold required to bring the related node into conscious awareness. In this way information can be retrieved by either the presentation of a stimulus that directly activates the nodal pattern in which the information is stored or by associated activated nodes lowering the threshold such that a more remotely related stimulus or cue can elicit that memory.

Bower (1981) suggested that each distinct emotion is represented by a specific node and these nodes are closely associated with other nodes such as particular autonomic patterns, events, or verbal labels. As a result of the spreading activation previously discussed, the prevailing mood or emotion a person is experiencing may serve to excite these closely connected nodes, lowering their threshold of activation. It is within this conceptual framework that researchers have investigated what products of cognitive processes achieve conscious awareness given various manipulations of affect.

These products of cognitive processes that researchers investigate must share associative pathways with emotional nodes and must be readily identifiable, communicable and measurable. The product of cognitive processes, identified as the dependent variable in experimental designs, often involves recall of words which have affective or emotional connotations. Although these words are subject to individual interpretation of both their

semantic and affective meanings, an objective method of measuring meaning is required for the purposes of research. Osgood and Suci (1955) suggested development of a scaling instrument to allow a word's qualities to be represented on established continuums of various major dimensions. Such scales allow for consensus on definition and are currently being used to assist in control and manipulation of qualities such as goodness, emotionality, and availability (Rubin & Friendly, 1986).

The empirical literature on the role of affect and mnemonic processes has concentrated on two major classes of effects, namely state dependence and mood congruence. State dependence suggests that what one remembers when in a given mood is dependent upon what one had learned when previously in that mood (Bower, 1981). Mood congruence research has demonstrated that when in a given mood one is more likely to remember information which possesses an affective valence congruent with that mood (Blaney, 1986). For a more extensive review of the literature related to these theories the reader is referred to a review by Blaney (1986). The present paper focused on mood congruence.

Mood Congruence

For the purposes of this paper, mood is identified as an organized pattern of responses which involve several psychological subsystems including hormonal, facial-expressive, postural, and cognitive systems (Mayer & Volanth, 1985). Affect-sensitive tasks as described by Mayer and Volanth (1985) are used to identify moods in that they reflect cognitive changes that occur with different moods. A test of memory which is controlled in terms of the

consistency between emotional state and emotional value of the to-be-remembered material would be considered an affect-sensitive task.

Mood congruence research has usually involved comparing a subject's ability to remember affectively valenced stimuli when in a mood which is either congruent or incongruent with the particular emotional loading of the targeted stimuli. Manipulation of mood is usually achieved through a mood induction procedure or by the selection of subjects with a preexisting prevalent mood as determined by self reports or personality inventories.

The use of subject variables to establish the presence of a particular mood has demonstrated that emotion does have an impact on cognitive processes. Depressed and non-depressed subjects are two of the best researched subject categories. Studies using these individual differences suggest that depressives show some evidence of an under-recall of positive material or possibly a preferred selectivity for negative material (DeMonbreau & Craighead, 1977; Johnson, Petzel, Hartney, & Morgan, 1983). These findings demonstrate the clinical significance of research involving mood and memory in that they identify a distinct difference in the cognitive output of an endogenously depressed versus non-depressed subject.

Unfortunately, studies utilizing individual differences fail to provide insight into the specific role emotion has on the memory process itself. As Blaney (1986) points out these effects may be the result of a chronic priming of specific cognitive themes. Subjects may generate self referent thoughts which cause these effects independent of mood. Their behavior may be the product of a pattern of thought unique to the particular subgroup isolated by the screening process and irrespective of emotional differences.

The practice of using subject variables has also been criticized for its lack of discriminative validity. Russell and McAuley (1986) suggested that subjects may have self-defeating causal attribution styles which initiate negative affective reactions. These proposed attribution styles may provide little discriminative validity in that they can be used to explain not only depression but a variety of behaviors including psychosomatic complaints and assertiveness problems (Nezu, Nezu, & Nezu, 1986).

Mood Induction Procedures

The use of mood induction procedures avoids the limitations of individual differences in that the isolation of a unique subgroup is unlikely when subjects are randomly assigned to experimental groups. Mood induction procedures also help avoid the possibility that historical differences, common to a subgroup identified by an inventory, could be used to explain any experimental results (Blaney, 1986).

There are six methods of mood induction which have been popular in recent research. The Velten Mood Induction Procedure is one of the more frequently used methods. It involves having the subjects read affectively loaded sentences and requesting them to assume the respective mood (Velten, 1968). Hypnosis is another mood induction method in which subjects, under the suggestion of a hypnotist, are asked to recall an emotional event and to maintain an appropriate level of that emotion (Bower & Mayer, 1985).

The method of success/failure exercises for mood induction involves a procedure in which the experimenter manipulates the success/failure ratio a subject experiences. There is an assumption involved, that failure is congruent

with depression (Blaney, 1986). Music has also been used as an alternative way to induce mood. In one study, subjects were asked to listen to music which was suggested may change their mood (Clark & Teasdale, 1985).

Memory elicitation is a method of mood induction similar to hypnosis in that subjects are simply asked to dwell on personal past experiences which are associated with particular moods. Finally, posturing is an alternative form of mood induction in which the subject is asked to pose their face or body in a position which portrays a mood, such as a happy facial expression. Laird, Wagener, Halal and Szegeda (1982) demonstrated that manipulations of facial expressions can affect recall of emotionally evocative material. They suggested their subjects experienced an emotion which was consistent with their facial expression and the autonomic physiological messages the expression generated.

In an extensive review of mood induction studies, Blaney (1986) reported that the majority of the results support mood congruent bias in recall. Unfortunately, the mood induction procedures also have drawbacks. Subjects may have adopted and maintained moods as a result of compliance with instructions as opposed to being affected by the technique itself. It has been suggested that instructions such as those used in the Velten, hypnosis, musical, and memory elicitation styles may contribute to the mood shifts (Blaney, 1986; Mecklenbrauker & Hager, 1984). For instance, the induction procedure may have actually induced the mood initially, but the person avoids the natural decay or tendencies to counteract the mood because of directions to maintain it.

The converse criticism has been made about posturing. It has been suggested posturing provides too little direction. Blaney (1986) points out that a

subject may react with selective attention when trying to resolve the emotions generated by artificially contrived motor messages. The source of the emotions may not be apparent and as a result the person may try to explain the emotions generated, by focusing attention on situational stimuli congruent with the respective emotion. If these criticisms relating to directions are accurate either of these situations could result in preferential encoding of mood congruent stimuli as a result of the technique rather than the mood itself.

A third criticism of several of the mood induction techniques involves the suggestion that mood induction procedures may serve to prime specific cognitive themes which subsequently influence the processing of information and the resulting products of memory (Blaney, 1986). This interpretation would indicate a more directed, cognitively controlled effect resulting from the induction procedures. The subject may be motivated to incorporate the stimulus experience into some self-referent category containing similar experiences. Blaney (1986) described several such possible processing strategies which may be motivated as a result of the induction procedures including self-verification and esteem repair. The example involving esteem repair suggested subjects may focus on self-derogatory material in order to counter it.

Using this interpretation, experimental findings could be considered to be the result of directed cognitive processes as opposed to global affective influences. Avoidance of this alternative interpretation requires a mood induction stimulus set which fails to activate any significant past experience or the cognitive strategy employed to cope with that experience.

Exposure to Facial Expression as an Alternative

It has been demonstrated that nonverbal cues such as facial expression communicate affect and result in increased recall (Johnston & Strickland, 1985). Using pictures of faces expressing emotion to induce desired moods may supply an alternative induction technique which avoids the criticisms stated above.

The presentation of pictures of faces expressing emotion would avoid the confounds mentioned concerning directions. The emotional reaction generated by these pictures is believed to be largely involuntary (Hoffman, 1984), and should not require directions to draw attention to the subject's current mood state. At the same time the expressive cues are salient enough that the subject can identify the source responsible for the affective response. This would avoid the argument directed at the limited instructions of the posturing method. The subject would not need to focus attention on the target stimuli to resolve uncertainty over the source of emotion.

These pictures would provide nonverbal expressive cues which would require shallow levels of information processing namely sensory registration and pattern recognition (Hoffman, 1984). The lack of required cognitive input would discourage the third criticism cited above which suggested the stimuli had triggered specific encoding strategies as a result of its similarity to a previous experience. Hoffman suggested that while verbal messages require more complex processing such as semantic interpretation, empathic emotion aroused by nonverbal cues is largely involuntary. He also suggested that the

presence of the model's nonverbal expressive cues may help keep the observer's attention focused on the model and away from self-reference in the form of conjuring up similar life experiences.

Given the involuntary nature of the emotional response and the shallow level of processing required (Hoffman, 1984), it may be possible to alternate the elicited response on a continuous basis. Our emotions shift momentarily in response to incoming stimulation in our day to day life. Presentation of facial expressions may offer a technique which can be easily engaged on a continuous basis throughout the course of an experiment. Each individual face may be paired with a respective target item as the exposure to the target set proceeds. This avoids the problem of maintaining an induced mood throughout the course of encoding and recall as stated by Mecklenbrauker and Hager (1984). Research results would be based upon recall for discrete single-item mood-congruent or incongruent events.

The use of exposure to facial expressions to induce mood would also allow for a convenient control condition. Neutral facial expressions and neutral words would provide a congruent comparison condition with limited affective associations. This would allow for a clearer separation of the effect of congruency in affective associations.

This form of mood induction may also shed light on the role of self-referencing in the demonstration of mood congruent effects. Self-referencing refers to the process in which the subjects consider the stimulus material's applicability to themselves. It has been questioned whether self-referencing is a necessary condition for a mood congruent effect to be demonstrated. Up until now self-referencing represented a confound in research involving mood

induction as studies demonstrating mood congruency effects encouraged the process of self-referencing through either explicit directions or the use of self-relevant stimulus material (Blaney, 1986).

The difficulty of avoiding self-reference is linked to the difficulty in demonstrating a mood congruent effect with an exposure set that is congruent with the mood induction effect yet does not encourage self-referencing. Clark and Teasdale (1985) suggested that their study demonstrated mood congruent effects while using a non-self-referencing exposure set, yet their use of personality trait words makes this claim questionable. The trait words themselves may have activated a self-evaluative construct system. The use of unfamiliar emotional faces and the involuntary affective response they elicit would limit the significance of self-referencing in the inferred cognitive process allowing for more emphasis on the role of emotion in the explanation of experimental results.

Exposure to facial expression as a form of mood induction may also provide a valuable tool for research involving the role of gender in mood congruence effects. The variable of gender appears to have been neglected and further research would seem to be indicated. In the literature reviewed, the effects of gender had been identified as a variable only once and at that time it proved to be significant (Clark & Teasdale, 1985). In Clark and Teasdale's (1985) study, mood congruence effects were demonstrated for women only, the finding being explained as the result of higher usage of the stimulus words by women. Clark and Teasdale support their explanation by citing a study by Landis and Burtt, (1924) which was based upon naturalistic observation and suggested women spent more time talking about people. This would suggest more frequent use of

trait words such as nice or rude which describe interpersonal behavior.

Unfortunately it is difficult to control for differences between genders for frequency of word usage and word emotionality. Bellezza, Greenwald, and Banaji (1986) suggested that there are differences between the way genders rate words. These investigators found that on scales measuring pleasantness and scales such as familiarity which attempts to measure frequency of usage, females demonstrated a tendency to use more extreme ratings than did males.

Gender differences regarding the effects of exposure to facial expression were identified by Hall (1978). This study suggested that females were better able to judge the meanings of visual nonverbal cues of emotion. Hall (1978) reviewed seventy-five studies measuring judgements of emotional states communicated by nonverbal cues conveyed by face, body, or voice tone. Fifty-five of the studies used a visual channel of communication. This finding underscores the importance of considering gender of the subject as a variable when investigating a nonverbal visual alternative to standard forms of mood induction.

Based on the literature reviewed it was concluded that exposure to facial expressions would be an alternative method of mood induction worthy of investigation. This type of procedure may demonstrate the mood congruence effect for targeted stimuli (words) which have an affective valence congruent with that of the respective facial expression, happy or sad. Given the previous research suggesting that gender may be a factor in the reliance on nonverbal expressive cues, one may also expect an interaction between subject gender and mood congruence. It may be necessary to present the nonverbal induction stimuli in a manner that precludes the use of associated verbal labels which

could overshadow their effects. Women may show greater recall of congruent words and less recall of incongruent words than men as they may be more sensitive to the affectively valenced nonverbal expressive stimuli as well as the words.

The purpose of this study was to assess the effectiveness of presentation of pictures of emotional faces as a mood induction procedure. It also assessed whether gender plays a significant role in the procedure's effects.

If pictorial presentations of emotional faces can be demonstrated as an effective alternative to the usual forms of mood induction, this procedure could provide a valuable research tool. It would allow for less ambiguous interpretation of mood induction research by more clearly separating the effects of affect from those of cognitive input. It was reasoned that this research might also have clinical implications in that, if demonstrated to be effective, the procedure could draw attention to the role nonverbal, minimally self-referent stimuli play in initiating and maintaining depressive schemata. It would emphasize the importance of recognizing and identifying affective reactions to stimuli which require minimal cognitive input.

The study involved exposing college students to pictures of faces expressing happy, sad, or neutral emotions. The question was whether these pictures of facial expressions would cause the subject to experience an emotional reaction congruent with the emotion of the particular face being viewed. These expressions were paired with words which, it was assumed, possessed minimal self referent qualities. The words were all nouns representing concrete concepts. Use of trait names or words which are descriptive of personality were avoided. The words did possess positive,

negative, or neutral emotional connotations.

Subjects saw blocks of various expression/word combinations and a comparison was made of their ability to recall words which were emotionally congruent or incongruent with their paired picture. Emotionally congruent expression/word pairs were pairs in which both the pictured expression and the word had the same affective valence, e.g. the picture of a happy face was paired with a positive word. After an initial exposure to the expression/word pairings the subjects were shown the pictures of the facial expressions and asked to recall which word had been paired with each particular picture.

Hypotheses

1. Subjects will show a mood congruency effect, that is, they will show greater accuracy for recalling words which were emotionally congruent with their associated picture.
   a. Recall in conditions where positive words are paired with happy faces and negative words are paired with sad faces will be greater than recall in conditions where positive words paired with sad faces and negative words are paired with happy faces.
   b. Recall in conditions where positive words are paired with happy faces and negative words are paired with sad faces will be greater than recall in conditions where neutral words are paired with neutral faces due to the increased associative value provided by the emotional cues.
2. Assuming that female subjects may be better able to process visual nonverbal cues of emotion, they may experience a stronger emotional reaction to the mood induction procedure. There will be a three way

interaction involving Subject Gender x Word Type x Expression Type. Female subjects will demonstrate better accuracy for emotionally congruent pairings and worse accuracy for emotionally incongruent pairings than males.

3. The strength of the elicited emotional response will also be demonstrated by the types of errors subjects make. Based on the network theory, emotions generated by exposure to facial expressions should lower the threshold of activation for words with similar affective associations. When responding incorrectly subjects will make a significantly greater number of mistakes involving erroneous assignment of target words to emotionally congruent as opposed to incongruent or neutral facial expressions.
   a. Positive target words will constitute erroneous responses to happy expressions more often than would be expected by chance.
   b. Negative target words will constitute erroneous responses to sad expressions more often than would be expected by chance.

Method

Subjects

One hundred and twenty university students taking introductory psychology voluntarily participated and received bonus points for their cooperation. There were sixty male subjects and sixty female subjects. All subjects reported that they had normal or corrected to normal vision.

Materials

Slides of happy, sad or neutral facial expressions of six different models were used. There were three male and three female models; these models were selected from a slide package developed by Ekman and Friesen (1976). They developed a series of slides representative of particular emotions by using university students to judge selected slides through two methods. In one method the students were asked to choose one of six words to describe each slide; in a second procedure they rated each slide on each of six categories of emotion using a seven point scale. With the exception of the neutral expressions, all slides included in the slide package were judged to show the intended emotion by at least seventy percent of the students.

Four of the fourteen available models had neutral as an alternative choice in Ekman and Friesen's (1976) study. Due to the limited information available as to consensus on neutral expressions, slide selection for the current study was based primarily upon consensus for happy and sad expressions. The models chosen from the slide package all received at least ninety percent agreement from judges as to their happy and sad expressions. The particular slides used are designated in Appendix A. Samples of the actual expressions

of both a male and a female model are illustrated in Appendix B.

Slides of thirty-six different target words were used. In an effort to minimize self-reference or the possibility that the words themselves may activate a self-evaluative construct system, only concrete nouns were used as target words. That is, affectively valenced personality trait names were avoided. These words were chosen by inspection by the experimenter.

Word selection was based upon scales for goodness, emotionality and availability presented in Friendly and Rubin (1986) and a scale for imagery presented in Paivio, Yuille and Madigan (1968). The words were initially divided into categories based on their positive, neutral, or negative connotations. The word lists, scale scores, scale score means and standard deviations are presented in Appendices C, D, and E. Membership in these three categories was decided by each word's score on a rating scale of goodness. The words had been rated on a seven point scale of how intensely good or bad the subjects judged their meanings (Friendly and Rubin, 1986). A three way analysis of variance indicated that the word categories designated as positive, neutral and negative were significantly different in terms of their ratings on the goodness scale, $F(2, 23) = 528.79$, $p < .01$. The analysis of variance for the goodness scale is presented in Appendix F, Table F-1. Pairwise comparisons using the Scheffé test indicated significant differences between all three categories based on goodness scale scores (see Appendix G).

Controls were then used to equate the word categories for the strongest predictors of ease of recall, namely, availability, imagery and emotionality (Friendly and Rubin, 1986). It was not possible to equate neutral words with

positive or negative words for level of emotionality as a result of their necessary unemotional nature.

Definition of these predictors of recall are presented in the following paragraphs. Availability refers to a word's accessibility and has been measured by the ease with which the word comes to mind in free association (Friendly and Rubin, 1986). Imagery is defined as the ease with which a word arouses sensory images (Paivio, Yuille and Madigan, 1968). A three way analysis of variance on scale scores for availability and imagery did not indicate a significant difference between the positive, neutral and negative word categories. The analysis of variance calculations are presented in Appendix F, Tables F-3 and F-4, respectively.

Emotionality was based upon each word's rating on a seven point scale from not emotional (1) to emotional (7) (Friendly and Rubin, 1986). A three way analysis of variance indicated that the word categories designated as positive, negative and neutral were significantly different on the emotionality scale, $F(2, 33) = 79.29$, $p < .01$. Pairwise comparisons using the Scheffé test indicated the positive and negative word categories were not significantly different based on their emotionality scale scores. However, both the positive and negative word categories were significantly different from the neutral word category in terms of emotionality (see Appendix G). Thus, although positive and negative word categories differed significantly in terms of their goodness rating they were of comparable strength in terms of their ratings of emotionality.

Slides were presented on a Kodak AF-1 slide projector.

Design and Procedure

The experiment used a (3 x 3 x 2) x 2 mi :d design. Three levels of

expression type (happy, neutral, sad), three levels of word type (positive, neutral, negative) and the two levels of model gender (male, female) served as within-subject factors. The fourth factor was a between subjects variable which involved subject gender (male, female). Upon arrival subjects were given a brief explanation of the experiment which described it as a measure of memory in which they were not expected to remember each target word but were encouraged to try their best. The exact instructions are presented in Appendix H.

Subjects were exposed to four sets of nine expression/word combinations. Each set contained all of the nine possible expression type by word type pairings. Within each set, all slides were presented for two seconds. The subject saw a facial expression followed immediately by a word, which in turn was followed by a blank slide. This sequence was continued until all nine expression/word combinations had been presented. The subject was given ten seconds to rest and was then shown the nine facial expressions in random order and asked to recall which word was paired with which expression. After the attempted recall for each set there was a thirty second rest period. Following the rest period subjects began the next set and continued until all four sets were presented.

The order of presentation of the nine types of pairs was randomly varied within every set. During the recall phase, the order of presentation of the facial expressions was also randomly varied. This randomization of the presentation orders of pair types and expressions acting as primes was an attempt to evenly distribute the effects that recency and primacy of occurance had on the dependent variable.

The gender of the models alternated from set to set with two sets containing the three male models and two sets containing the three female models. The order of appearance of each model within the set and the particular model/word combination was randomly varied from subject to subject. These measures were provided to avoid possible confounds resulting from consistent differences caused by particular words, models, or orders of presentation.

Each subject saw each of the thirty-six words once. Each model's three facial expressions were seen twice, occurring once in two independent sets with a set using alternate gender models separating the two appearances. The non-repetition of target words was used in an attempt to avoid a frequency effect. The repetition of model's expressions allowed for manageable balancing of order of model appearance.

Results

Recall Data

A four-way analysis of variance failed to demonstrate a significant main effect or interaction for the variable of subject gender. The data for male and female subjects was collapsed and a three-way analysis of variance was conducted on the variables of Model Gender (male, female), Expression Type (happy, neutral, sad), and Word Type (positive, neutral, negative). A significant main effect was found for Word Type, $F(2, 236) = 12.36$, $p < .001$. The mean recall rates were, .307 (SD = ± .24) for positive words, .243 (SD = ± .20) for neutral words, and .363 (SD = ±.26) for negative words.

Exploration of the main effect through pairwise comparisons using the Tukey test showed that the recall of positive and negative words was not significantly different. Tukey pairwise comparisons showed recall of both positive and negative words was significantly higher than recall of neutral words, $p < .05$, and $p < .01$ respectively.

The three-way analysis of variance revealed two significant two way interactions. There was a significant interaction between Model Gender and Word type, $F(2, 238) = 3.58$, $p < .05$, as shown in Figure 1. The means and standard deviations for this interaction are presented in Appendix I. Tukey pairwise comparisons revealed that when target words were paired with female models subjects showed significantly better recall of positive and negative words compared to neutral words ($p < .01$). When target words were paired with male models recall of positive and negative words was not significantly different than recall of neutral words.

Examination of Figure 1 shows recall of positive words paired with male models is noticeably lower than recall of other non-neutral target words. Positive words paired with male models are significantly lower in recall than both positive and negative words paired with female models ($p < .05$). Subjects' recall of negative words paired with male models is not significantly different than recall of positive or negative words paired with female models.

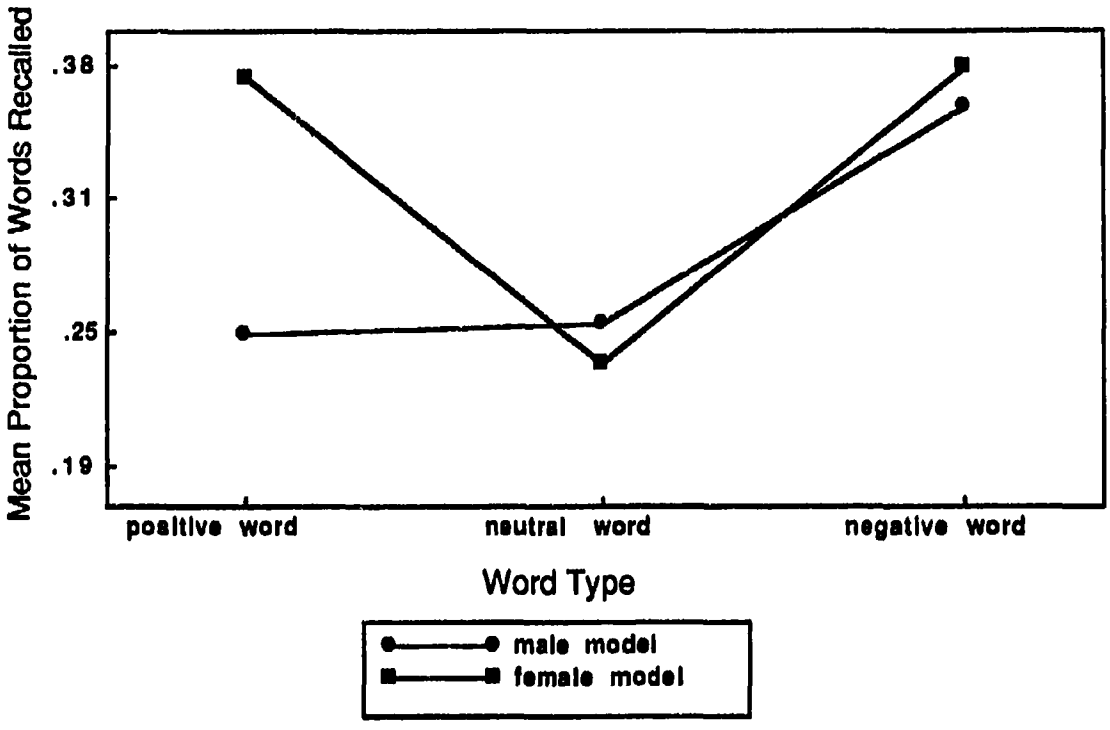

Figure 1. Recall of positive, neutral and negative words when paired with male and female models.

The second significant two way interaction involved Model Gender x Expression Type, $F(2, 238) = 4.34$, $p < .05$, as shown in Figure 2. Tukey tests indicated three significant differences between the conditions represented in

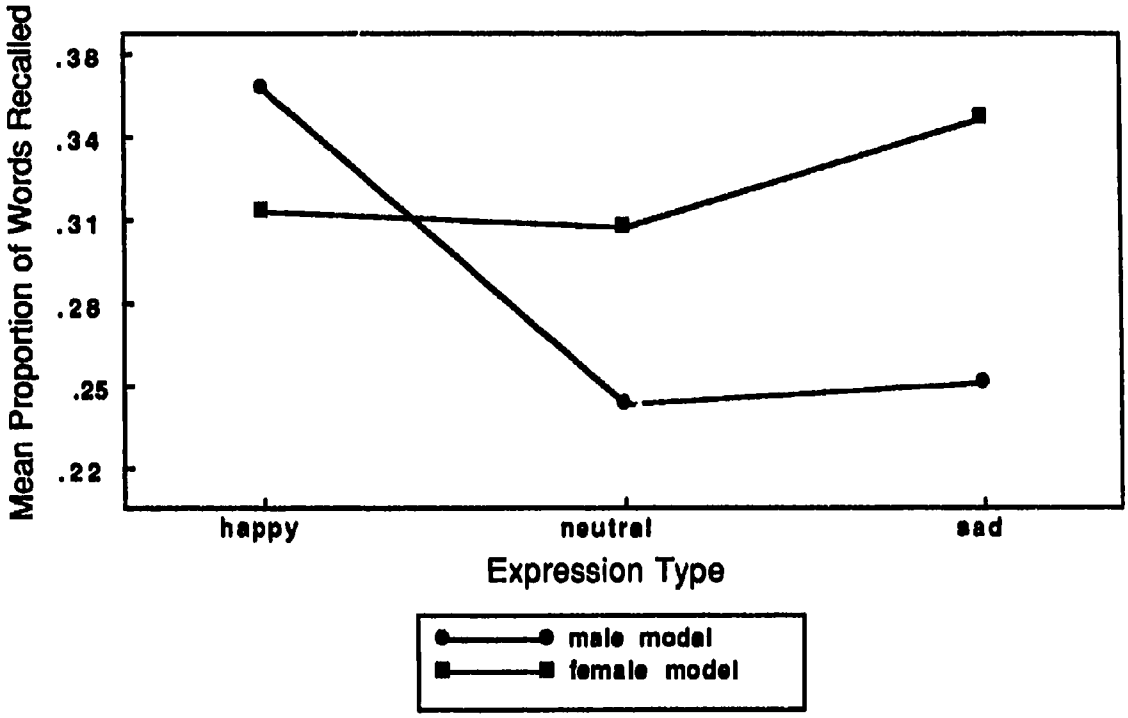

Figure 2. Recall of stimulus words when paired with male and female models showing happy, neutral and sad expressions.

the Model Gender x Expression Type interaction. Recall of target words paired with males showing happy expressions was significantly greater than recall when the males' expressions were neutral or sad ($p < .05$). Recall for words paired with a female model showing a sad expression was also significantly greater than recall for words paired with a male model showing a neutral expression ($p < .05$).

There was a marginal three way interaction involving Model Gender, Word Type and Expression Type. Although this interaction did not achieve a level of statistical significance $F(4, 476) = 2.25$, $p < .06$, it does bear mentioning as it has implications regarding interpretation of the data. Aside from negative words paired with happy male models, recall for words involving non-neutral expressions and non-neutral words demonstrated a response pattern consistent with a mood congruence effect. The negative words paired with happy male models actually demonstrated an incongruency effect by showing superior recall to words in the congruent happy male/positive word condition.

Error Data

The chi square calculations analyze the errors subjects made by responding with words that were not previously associated with the respective slide of a facial expression. Chi square analysis of distribution of the three possible error types (i.e., positive, neutral, or negative words) in response to a specific expression type revealed similar results for both male and female subjects. Analysis of error distribution based on word type showed significant results for positive and negative expressions but not neutral (see Table 1.).

The actual distribution of numbers for each of these conditions are presented in Appendix J. Inspection of the column totals within the chi square tables shown in Appendix J demonstrates that when presented with positive or negative expressions male subjects were most likely to respond with a word that was affectively congruent with the expression. Female subjects showed a similar pattern of responding to sad expressions. When cued with a sad

Table 1

Summary of Chi Square Error Distribution

Distribution of Word Types across Expression Type

Subject Gender	Expression Type	df	N	value	p
male	happy	4	194	14.94	.005 **
male	neutral	4	237	2.90	.575
male	sad	4	229	16.58	.002 **
female	happy	4	226	12.10	.011 *
female	neutral	4	202	7.32	.120
female	sad	4	203	13.07	.011 *

** p<.01 (N: refers to sample size)

* p<.05 (value: refers to the obtained value of the test)

expression in the recall phase they were most likely to respond with a negative word. However, when cued with a happy expression in the recall phase female subjects were as likely to respond with a negative word as a positive word.

As indicated in the chi square table (Table 1), when presented with a neutral expression subjects did not respond with any one word type more often than would be expected by chance.

Discussion

Qualified support was provided for exposure to facial expressions as a viable form of mood induction. When words were paired with female models the pattern of response was consistent with the predictions of Hypotheses 1 (a) and 1 (b). Subjects did show better recall for positive and negative words when they were paired with affectively congruent female expressions. Also as predicted, congruent pairings with positive and negative connotations showed better word recall than the pairings using neutral expressions and neutral words. Thus the mood congruency effect predicted by Hypothesis 1 was supported tentatively by the nonsignificant pattern of response demonstrated when target words were paired with female models and when positive target words were paired with male models.

These findings are consistent with previous research which demonstrated a nonsignificant mood congruent pattern of response. When using procedures which contra-indicate or discourage self-reference response patterns, although consistent with mood congruence, have tended to be below statistical significance (Blaney, 1986). This has also been found to occur when using interconnected positive and negative to-be-remembered material (Mecklenbrauker and Hager, 1984)..

The results failed to provide any support for Hypothesis 2 which had predicted that, compared to males, female subjects would show superior recall for words in congruent pairings and poorer recall for words in incongruent pairings. This hypothesis represented an effort to take into consideration a

possible intervening variable should the procedure be found to be useful. As it turned out subject gender was not found to be significant at any level of the analysis. Based on present findings the pattern of response to exposure to facial expressions did not differ on the basis of subject gender.

Hypotheses 3 was supported by the error data. If unable to recall the target word it appears the subjects were most likely to respond with a target word which was affectively congruent with happy and sad expressions being presented in the recall phase. Subjects appeared to be responding to the affect generated by the model's expression at testing and not the particular expression/word combination in which the expression was originally presented. This implies that the expressions were able to elicit affective responses which were also associated with the target words. This data indicated that the models' expressions were able to elicit an emotional response which was strong enough to influence the recall process.

It should also be noted at this time that the distribution of errors generated in response to the same models showing neutral expressions did not differ from what would be expected by chance. This suggests the generation of affectively congruent words is the result of a response associated with the expressions and not some characteristic of the faces themselves. It appears that the expression was the critical factor in eliciting the affective response from the subjects.

In retrospect it would seem necessary to reconsider discussing this procedure in terms of mood congruence. The term mood implies a characteristic of constancy not established as being present in this study. it is unrealistic to expect that the manipulation used induced a pervasive, enduring

mood. It may be more appropriate to refer to the proposed effect as the emotion or affective response elicited by the expressions and to speak of the procedure as an alternative to current forms of mood induction.

The necessity of addressing the unexpected and outstanding recall of negative words paired with happy male expressions is apparent. This condition failed to support the mood congruent trend shown by the other affectively valenced conditions. The strong recall of its mood incongruent negative word was also in direct opposition to what had been predicted.

One can only speculate as to what caused subjects to show the preferred recall for the incongruent pairing with male models. There is a scarcity of literature investigating incongruency effects and no published reports relating the role of affect in this phenomenon. The literature which is available focuses on the easier recall of target items in an incongruous condition when subjects are required to generate the target items themselves (Horton, 1988; McFarland, Frey & Rhodes, 1980; Roenker, Wenger, Thompson & Watkins, 1978). These reports are not pertinent to the present discussion as they focus on cognitions, disregarding the role of emotion.

It is possible that the discrepancy between the affective response to the expression and the affective response to the word resulted in cognitive dissonance as described by Festinger (1957). His theory of cognitive dissonance suggests that people find inconsistent information unpleasant and attempt to reduce or eliminate it. There is also the assertion that dissonant information would tend to be salient immediately following presentation (Brehm & Cohen, 1962; Festinger, 1957). The immediate salience of dissonant information was demonstrated in an unpublished doctoral dissertation by Brehn

which is described in a text by Brehn and Cohen (1962). It may be that the target words were more easily accessed due to greater salience resulting from cognitive dissonance.

The cognitive dissonance explanation, while plausible, does not account for why the incongruency effect was specific to male models for that particular type of incongruent pairing. This finding remains unexplained and emphasizes the need for further investigation of this procedure as an alternative to mood induction. Replication of the study may provide an indication of whether the incongruity effect is a stable effect or simply an isolated artifactual phenomenon.

One may also speculate that this specific incongruent pairing may represent a unique situation that is qualitatively different from the other conditions. The consistency with which the remaining affectively valenced expression/word combinations agreed with the predicted pattern emphasizes the uniqueness of the happy male/negative word pairing. As a result of its' particular attributes subjects may have focused more attention on this pairing. Some unique characteristic may have resulted in this pairing being set apart from the other conditions and the interference they provide. The superior recall may be the result of a different, possibly deeper form of processing. It is not certain what may have caused this proposed difference in processing

It is interesting to note the difficulty in describing the impression left by observing the smiling face of a male model (such as the one pictured in Appendix B) followed by a word such as blister or corpse. Several subjects had commented on the salient nature of this type of expression/word pairing although they had difficulty describing the associations the pairing elicited. The difficulty in verbalizing why this particular pairing commands attention may

emphasize a predominant affective response which sets it apart.

Another consideration regarding the results found in this research relates to the administration procedure. The present study introduced an alternative to standard types of mood induction stimuli as well as a new form of presentation. Constant random variation of the type of expression presented and subsequently the type of emotion elicited may in itself have contributed to the demonstrated effects. The next move may be to attempt to separate the innovations and see if an affective congruency effect can be demonstrated without using the present type of administration. Unfortunately it is difficult to separate the stimulus and the administration style and still retain the proposed benefits of the procedure.

Pictures of particular facial expressions could be presented in blocks with subjects seeing specific types of expressions back to back. The to-be-remembered material could be presented subsequent to these expressions. This could indicate whether the present findings are isolated to single event presentations. It would also assist in determining whether the happy male/negative word combination was unique as a specific combination or whether this phenomenon generalizes to blocks of happy male models followed by negative words. It should be noted that the extra time necessary to show a block of slides would also allow subjects more time to elaborate on the information presented and/or resort to strategies which would assist recall.

A second variation on the procedure would be to block the single event conditions thereby exposing the subject to a series of consistent similar expression/word pairings. The conditions could then be compared in terms of proportion of correct responses to specific expressions or the total number of

words recalled for that condition. This procedure would avoid the continuous shift of expression type used in the present study. It would determine whether the congruent and exceptional incongruent condition could produce a similar strong recall effect without the close contrast of conditions provided by the alternation of expressions. Unfortunately this procedure would also seem to have drawbacks. This variation would allow for anticipation of expression type possibly contaminating the involuntary nature of the emotional response to the facial expression. Subjects may focus attention on facial features to assist in matching the word with its respective facial expression.

As indicated by the variations on design discussed above, it is difficult to separate the benefits of stimulus from those of style of administration. The advantage of this procedure relies on the argument that the emotional response which is activated requires shallow processing and requires little introspection.

There are two procedural changes recommended for researchers interested in further investigating this alternative to mood induction procedures. It may be more effective to use a restricted range of values in equating the target word lists for the qualities of goodness, emotionality, availability and imagery. In only using words within a specified range of scores the experimenter is able to avoid words which possess outlying, extreme values on the various scales. Although the process of randomization discouraged the likelihood of words having some sort of consistent effect in any interaction, several words in the negative word list may have contributed to the main effect due to comparatively stronger qualities as measured by these scales (see Appendices C, D and E).

Avoiding repetition of specific models within any block of expression/word

pairings may also improve the present procedure. It is likely this change would decrease the difficulty of the task allowing greater success in recall and possibly providing a larger more clearly defined pattern of correct responses. Several subjects commented upon how seeing the same person's face three times within a block of expression/word pairings added to their confusion.

The present study provides qualified support for exposure to facial expression as a viable alternative to standard mood induction procedures. With the exception of the male model happy expression/negative word condition, the remaining data were found to be in a pattern consistent with the predicted hypotheses. Present findings encourage further research regarding this method and also emphasize the importance of consideration of the gender characteristics of mood induction stimuli.

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Appendix A

Model number and Identification as designated byEkman and Friesen (1976)

Number	Identification	Expression	Gender
07	C-2-18	happy	female
08	C-1-18	sad	female
13	C-2-03	neutral	female
48	MF-1-06	happy	female
49	MF-1-30	sad	female
56	MF-1-02	neutral	female
93	SW-3-09	happy	female
94	SW-2-16	sad	female
99	SW-3-03	neutral	female
14	EM-4-07	happy	male
15	EM-4-24	sad	male
21	EM-2-04	neutral	male
34	JJ-4-07	happy	male
36	JJ-5-05	sad	male
41	JJ-3-04	neutral	male
74	PE-2-12	happy	male
76	PE-5-07	sad	male
83	PE-2-04	neutral	male

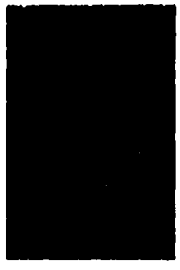
Appendix B

Examples of models' expressions

Happy

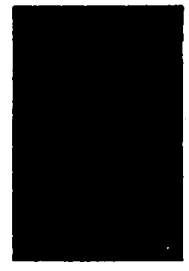
Neutral

Sad



Happy

Neutral



Sad

Appendix C

Positive word list and scale scores

Word	Goodness	Emotional	Available	Imagery
breeze	5.23	4.18	35	5.87
cash	5.13	3.79	152	6.17
dawn	5.54	4.50	53	6.37
decoration	5.02	3.96	11	5.37
dove	5.71	4.80	103	6.53
encore	5.36	4.43	7	4.00
gift	5.59	4.71	157	5.77
joke	5.55	4.71	260	4.27
nectar	5.23	3.20	2	5.33
poetry	4.84	4.59	158	4.90
truce	5.46	4.89	5	4.80
yacht	4.80	3.36	97	6.77
Mean	5.29	4.26	88.67	5.51
SD	.3	.57	82.26	.89

Appendix D

Negative word list and scale scores

Word	Goodness	Emotional	Available	Imagery
blister	2.38	3.66	12	6.53
corpse	1.88	5.45	19	6.50
disease	1.75	4.91	367	4.87
gore	1.89	5.16	10	4.67
jail	1.66	4.79	240	6.43
lice	1.73	3.66	22	5.57
missile	2.41	3.82	19	6.33
noose	1.64	4.84	19	6.23
pollution	1.68	4.59	14	4.63
prisoner	2.21	4.95	176	6.23
venom	1.84	4.91	7	4.23
weapon	2.32	4.49	88	5.73
Mean	1.95	4.6	82.75	5.66
SD	.3	.59	117.12	.85

Appendix E

Neutral word list and scale scores

Word	Goodness	Emotional	Available	Imagery
avenue	4.07	1.93	39	6.07
bronze	4.48	2.46	22	6.17
charter	4.21	2.30	5	3.83
edition	4.04	1.80	15	3.40
flask	4.20	2.43	39	6.50
gravity	4.07	2.59	34	3.60
item	4.05	1.30	18	3.67
sauce	4.18	2.04	133	5.80
steamer	4.20	2.36	22	6.53
tripod	4.04	1.88	14	6.23
volume	3.98	2.29	34	4.53
wigwam	4.00	2.36	5	6.23
Mean	4.13	2.15	31.67	5.21
SD	.14	.37	34.08	1.28

Appendix F

Table F-1

Summary Table for Analysis of Variance for level of Goodness

Source	df	SS	MS	F
Between groups	2	68.964	34.482	528.785**
Within groups	33	2.152	.065	
Total	35	71.116		

** p<.01

Table F-2

Summary Table for Analysis of Variance for level of Emotionality

Source	df	SS	MS	F
Between groups	2	42.519	21.26	79.287**
Within groups	33	8.849	.268	
Total	35	51.368		

** p<.01

Table F-3

Summary Table for Analysis of Variance for level of Availability

Source	df	SS	MS	F
Between groups	2	22599.389	11299.694	1.566 ns
Within groups	33	238101.583	7215.199	
Total	35	260700.972		

Table F-4

Summary Table for Analysis of Variance for level of Imagery

Source	df	SS	MS	F
Between groups	2	1.255	.628	.596 ns
Within groups	33	34.726	1.052	
Total	35	35.981		

Appendix G

Summary table for pairwise comparisons

Comparison	Scale	Scheffe F-test
positive vs. negative	goodness	512.961*
positive vs. neutral	goodness	62.083*
negative vs. neutral	goodness	218.135*
positive vs. negative	emotionality	1.312
positive vs. neutral	emotionality	50.048*
negative vs. neutral	emotionality	67.57*

* $p<.05$

Appendix H

Instructions given to subjects

I am going to show you slides of faces and slides of words. You will see a slide of a face, then a slide of a word, then a blank, a slide of another face followed by a slide of a word then a blank, and so on. You will see nine of these face/word pairings, there will be a ten second break then the faces will be presented by themselves in random order and you are to try and recall the word which was paired with each face as the face appears. You are not expected to get all items correct but try to do your best. It is all right to guess. This procedure will be repeated four times in all. Following each recall phase there will be a thirty second break. Each word will be presented only once. Expressions will be repeated across sets but not within a set. As timing must be consistent across trials once we have begun any questions will be answered at the conclusion of the experiment. Are there any questions now?

Appendix I

Male Subjects

Errors when cued with a happy expression

Word type of correct response	Word type of incorrect response: Positive	Neutral	Negative	Totals:
Positive	16	12	26	54
Neutral	30	18	22	70
Negative	40	18	12	70
Totals:	86	48	60	194

Errors when cued with a neutral expression

Word type of correct response	Word type of incorrect response: Positive	Neutral	Negative	Totals:
Positive	26	25	25	76
Neutral	29	19	31	79
Negative	23	27	32	82
Totals:	78	71	88	237

Errors when cued with a negative expression

Word type of correct response	Word type of incorrect response: Positive	Neutral	Negative	Totals:
Positive	16	20	48	84
Neutral	26	16	29	71
Negative	22	30	22	74
Totals:	64	66	99	229

Female Subjects

Errors when cued with a happy expression

Word type of correct response	Word type of incorrect response: Positive	Neutral	Negative	Totals:
Positive	17	25	30	72
Neutral	33	16	29	78
Negative	27	31	18	76
Totals:	77	72	77	226

Errors when cued with a neutral expression

Word type of correct response	Word type of incorrect response: Positive	Neutral	Negative	Totals:
Positive	17	18	27	62
Neutral	29	18	20	67
Negative	26	28	19	73
Totals:	72	64	66	202

Errors when cued with a negative expression

Word type of correct response	Word type of incorrect response: Positive	Neutral	Negative	Totals:
Positive	17	23	34	74
Neutral	17	11	40	68
Negative	22	21	18	61
Totals:	56	55	92	203