1994

Emotional creativity :: exploration via creativity tasks, mood manipulation and self-report.

Jennifer Gutbezahl
University of Massachusetts Amherst

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EMOTIONAL CREATIVITY: EXPLORATION VIA CREATIVITY TASKS, MOOD MANIPULATION AND SELF-REPORT

A Thesis Presented

by

JENNIFER GUTBEZAHL

Submitted to the Graduate School of the University of Massachusetts Amherst in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

February 1994

Department of Psychology
EMOTIONAL CREATIVITY: EXPLORATION VIA CREATIVITY TASKS, MOOD MANIPULATION AND SELF-REPORT

A Thesis Presented

by

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Thanks to Arnie Well, Jerry Myers and Travis Gee for their useful suggestions about statistical analysis.
ABSTRACT

EMOTIONAL CREATIVITY: EXPLORATION VIA CREATIVITY TASKS, MOOD MANIPULATION AND SELF-REPORT

FEBRUARY 1994

JENNIFER GUTBEZAHNL, B.F.A., NEW YORK UNIVERSITY
M.S., UNIVERSITY OF MASSACHUSETTS AMHERST

Directed by: Professor James R. Averill

The ability to generate and combine authentic emotional responses effectively is examined as a form of creativity. In two separate studies, subjects who had been prescreened to determine their level of emotional creativity performed verbal and non-verbal tasks requiring emotional creativity. Subjects who scored higher on the prescreening showed greater creativity in performing these tasks. In the second study, the subjects' emotional, cognitive and artistic creativity were assessed, and the relation between the various forms of creativity examined. Emotions are considered to be mediated by cognitive processes, therefore a fairly high correlation was predicted between emotional and cognitive creativity. Because all forms of creativity are presumed to be related, moderate correlations were predicted between emotional and artistic creativity. This was borne out by the data. In the second study, the relationship between emotional creativity and mood was also explored. Subjects who scored high on the prescreening were able to acknowledge both positive and negative emotions at the same time.
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CHAPTER 1

EMOTIONS, CREATIVITY AND EMOTIONAL CREATIVITY

Introduction

Ever since Adam and Eve lost the battle with curiosity and bit into the apple, people have been struggling with their emotions. We fight to master our passions, rather than be enslaved by them.

Our emotions affect us physically, mentally and psychologically. Emotions are frequently viewed as powerful states which sweep over the individual, overriding cognitive control. Yet human beings are capable of shaping their emotional responses. This does not mean that emotions are stifled or denied. Emotions can be acknowledged and experienced honestly, while still allowing intelligent choices to be made as to the nature of the response.

Artists and musicians have acknowledged that the nature of the material or the instrument being used affects the nature of the work they create. Robert Rauschenberg has noted that "You begin with the possibilities of the materials, and then you see what they can do" (de Antonio, 1972). Ben Bagdikan has commented on the futility of "trying to play Bach’s St. Matthew Passion on a ukelele; the instrument is too crude for the work, for the audience, and for the performer" (Maddocks, 1985, p. 21).

As mastery of art requires the artist to attend to the nature of the materials, so mastery of emotions requires the emoter to attend to the nature of the emotions. The musician decides how to play, though the instrument shapes
the nature of the music. So, too, the individual decides how to respond, though
the raw emotions shape the nature of the response.

The emotions can be experienced and explored before being acted upon.
Making a conscious decision as to the nature of an emotional response, may
enable the individual to function more effectively. Casting agitation about a
difficult project as enthusiasm, rather than frustration, can lead to increased
motivation to work on a challenging enterprise rather than begrudging labor on an
overwhelming assignment.

Emotions are not all-powerful states which cannot be controlled at all, nor
are they behaviors which can be controlled precisely. What then are they?

Emotions

Emotions comprise a fuzzy set (see Rosch, 1978). Fuzzy sets cannot be
defined in terms of absolutes: Necessary and sufficient conditions. Fuzzy sets, by
definition, have fuzzy boundaries. Consider for example, the fuzzy set furniture.
Webster’s Unabridged Dictionary (1983) defines furniture as: "The movable things
in a room, apartment, etc., which equip it for living, as chairs, sofas, tables, beds,
etc." This is about as good a working definition as I’ve seen, and yet it excludes
lawn chairs, and includes silverware. Also, by this definition, bookcases are
furniture, but shelves which have been attached to the walls are not.

Clearly, defining the boundaries of fuzzy sets is no easy matter. There is a
large gray area of things which MAY be furniture, or may not be: Alarm clocks,
rugs, milk crates used as storage units. There are other items which are generally
accepted as members of the set. Those items which are nearly universally considered to be members of the set are prototypes (Rosch, 1978). A chair is a prototypical piece of furniture.

Just as there are no firm rules that delineate between those objects which are furniture and those which are not, there are no firm rules to distinguish between those states which are emotional and those which are not. Rather, there are certain general attributes that indicate that a state is an emotion (e.g. physiological arousal, a tendency to react in a certain manner, a subjective internal feeling). Any given emotion may have some of these attributes, but possession of any specific one of them is not necessary for a state to be defined as an emotion.

The nature of emotion has been a subject of debate since the beginning of mankind's written history. The ancient Greeks considered the emotions to belong to the category of passivity; they were suffered by the emoter, who was considered to have little control over them. Plato described the emotions as being located low in the body, far from the mind (cited in Averill, 1974). The emotions were viewed as separate from the intellect. Aristotle considered emotions to be housed in the nonrational part of the soul (cited in Averill, 1974).

Darwin (1872) considered emotional expressions to have been functional mechanisms, naturally selected, some of which may have outlasted their utility. Darwin saw emotions as primarily biological in their origin.

Early psychological study of emotion stayed with the notion of biological basis, focusing on physiological response. James (1890) regarded emotion as the
perception of bodily changes as they occur. Our laughter causes us to feel mirth; our tears, sorrow. James' conception of emotion was that of an almost immediate experience of bodily changes, with little mediation from cognitive processes. In his words "instinctive reactions and emotional expressions ... shade imperceptibly into each other" (James, 1980, p. 1058). This conception leaves little room for the individual to compose his or her own emotional responses.

Although James' theory in its purest form was eventually rejected, the idea that emotions require a non-cognitive physiological component continued to be almost universally accepted. The consensus was that although a cognitive process of attribution is needed to identify specific emotions, a physiological response is essential if passion is to be felt (e.g. Schachter & Singer, 1962; Shields, 1984; Truax, 1984).

Emotions have recently been approached from a more cognitively oriented viewpoint. Lang (1984) has proposed an associative network of affective cognitions, similar to Quillian's (1966) network for semantic knowledge. Salovey & Mayer (1990) have postulated an emotional intelligence, an ability to monitor one's own and others' emotions and use this information to guide thought and action. Oatley and Johnson-Laird (1987) consider emotions to be communicative mechanisms which moderate, and are moderated by, cognitive processes.

Emotions have also been studied in terms of social constructivism. Averill (1980) views emotion as a transitional social role based on appraisal of a given situation and experienced passively. Rather than the emotion being solely a
function of an individual’s cognitive processes, it is mediated by both the society in which the individual learned to label emotions (socialization) and by the individual’s learned responses (idiosyncratic processes).

However emotions are conceived, the prototypes (e.g. anger, joy, fear, sadness) are universally considered to be emotions. This is not the case with states near the fuzzy boundaries. If Schachter and Singer’s (1962) definition of emotion is accepted, then a subjective feeling state which is not accompanied by physiological arousal, such as hope, is not an emotion. If we accept Averill’s (1980) view of emotion as a state which is experienced passively, the term emotion does encompass non-arousing states such as hope. Indeed, Averill and his colleagues have written extensively on hope as an emotion (e.g. Averill, Catlin & Chon, 1990).

A broader, more cognitively based definition of emotion allows for individual or societal choices to be made as to the nature of the emotional response, and assigns to cognition a more central role. By adopting a definition such as this, we grant to the individual more control over the response. This control can be used creatively, to allow the individual a broader range of effective and authentic emotional responses.

Creativity

Creativity has been defined in a number of ways. As a break from rationality (e.g. Lynn & Rhue, 1986), as cognitive integration of diverse elements (e.g. Goldsmith & Nugent, 1984), as convergent-divergent thought patterns (e.g. Cagle,
1985), as the ability to create a shocking or surprising product (e.g. Bruner, 1962), and so forth.

Because my study draws on Avérill's work, I have decided to adopt his definition of creativity. Averill defines creativity as "those aspects of a person or process that contribute to a response that is judged to be novel, effective and authentic" (Averill & Nunley, 1992, p. 99).

Novelty

"Newness...on the whole does not consist of a new subject, but of a fine and novel grouping or expression."

- Nicholas Poussin, in Bellori's The Lives of the Modern Painters

Novelty can be looked at from two viewpoints. An idea or response can be novel because it creates a new framework for a specific idea or concept, yielding a new outlook; or because it combines existing ideas or concepts in a new way.

Examples of creative works that incorporate new outlooks are:

1. Salvador Dali's painting "The Crucifixion of Christ," which takes an eagle's-eye perspective, showing a view of Jesus on the Cross from above;

2. Beethoven's "Symphony No. 5," which incorporates a rhythmic pattern quite different from any being used at the time at which it was written;

3. Albert Einstein's theory of relativity, which relates matter and energy in a manner that had not been examined previously.
Examples of creative works that combine existing ideas or concepts in a new way are:

1. Richard Hamilton’s collage "Just what is it that makes today’s homes so different, so appealing?", which combines previously existing icons to create a new image;

2. Peter Schickele’s "Quodlibet for Small Orchestra," which combines themes from such diverse pieces as Old Folks at Home, the Brandenberg Concerti and Tea for Two;

3. The recent proof by Andrew Wiles of Fermat’s last theorem (there are no whole number solutions for $a^x + b^x = c^x$ if $x > 2$), which combines Fermat’s marginal notes on the subject with the work of many other mathematicians, incorporating mathematical processes that have developed since Fermat originally formulated the theorem.

Effectiveness

"It is not enough for a work to be learned; it must also be pleasing."

-Sir Joshua Reynolds, *Discourses on Art*

It is not enough to generate a novel ideal; the creative person must be able to present the idea in some way so that it can be communicated to others. The creative work must in some way "succeed," practically and aesthetically.

Dali’s "Crucifixion" and Hamilton’s "Just what . . ." are effective first of all because the artists successfully translated the ideas from their own minds to the real media in which they are executed. The ideas are communicated clearly to the
audience for whom the works were intended. Because these works are effectively executed, they enable the viewer to see the subject matter from a new perspective.

Beethoven’s Fifth Symphony and Schickele’s Quodlibet are effective in that they are playable on real instruments and are acoustically pleasing. The Fifth Symphony succeeds in stirring the emotions of the listener and the Quodlibet succeeds in amusing the listener.

The theory of relativity and the proof of Fermat’s theorem both conform to the rules of their respective fields, yielding testable hypotheses or falsifiable results. They have been effective in solving problems and generating new research and theories within the fields of physics and mathematics.

Authenticity

"An Original may be said to be of a vegetable nature; it rises spontaneously from the vital root of genius; it grows, it is not made."

-Edward Young, *Conjectures on Original Composition*

Authenticity is perhaps the most difficult aspect of creativity to define. A work is authentic if it is genuine, of internal origin. It needn’t be entirely invented, but there should be some aspect that is germane to the creator. Ideally, an authentic creation should lead to further discovery, not stagnation. It should open new vistas, and not simply be a repetition of past accomplishment.

Einstein and Wiles both formulated their own ideas, incorporating their personal views of the sciences, and applying them in new ways to the material already available to them. Beethoven spoke of hearing the music in his head, and
using this as a template for his works. Schickele drew upon his own preferences and knowledge of music, both classical and popular. Dali's perception of Jesus and Hamilton's view of modern life are reflected in their works.

**Emotional Creativity**

The same criteria of creativity—novelty, effectiveness and authenticity—that can be applied to art, music or cognition, can be applied to emotion.

An emotion is novel if it incorporates a new response. This response may be novel to the person experiencing the emotion, such as an adolescent's first stirring of love; or it may be novel to an entire culture, as in the Middle Ages, when society redefined love during the age of chivalry.

An emotion is also novel if it combines familiar emotions in a new way, such as feeling a combination of love and anger; or if it involves having a familiar emotion in an unusual situation, as when love is felt in a situation that might normally inspire anger or fear.

An emotion is effective if the behaviors that arise from the emotion are ones which can be performed and can benefit the person experiencing the emotion or those around him or her. It is effective if it helps the person experiencing it to solve a problem.

An authentic emotion is one which represents the self. This doesn't mean that the emotion acted upon is necessarily the emotion that first arises when a stimulus is presented. Rather, the emotion expressed is one which is germane to the person experiencing it, as opposed to one which is manufactured. For an emotion
to be authentic does not require that it be uncontrolled. A person can acknowledge and experience authentic emotions and still take an active role in consciously deciding how they should be expressed.

Prior Work on Emotional Creativity

There has not been very much empirical research done on emotional creativity, though there has been some work on non-conforming responses, showing them to be correlated with hypomania and schizophrenia (Lovejoy & Steurwald, 1992). This research focused solely on responses that were novel. It did not take into account the effectiveness or authenticity of the emotions. Novelty alone does not define creativity. By the criterion of effectiveness, a novel response which is maladaptive is NOT creative. Research that focuses on novel responses, without regard to effectiveness or authenticity is not research on emotional creativity. Although some of the responses studied may be creative, a large number are not.

Most of the work on emotional creativity has been done by Averill and his colleagues. Averill & Thomas-Knowles (1991) developed an inventory to assess emotional creativity. Subjects who had completed this inventory performed tasks that were considered to require emotional creativity. For example, one task required subjects to write a story incorporating three emotions that are incongruous with one another (e.g. serene, bewildered and impulsive). Subjects who scored high on the emotional creativity inventory were more effective at describing combinations of emotions in novel yet meaningful ways.
Later work (Gutbezahl & Averill, 1992) compared scores on a revised version of the emotional creativity inventory with scores on the NEO five-factor inventory (Costa & McCrae, 1978), an inventory designed to measure the "big five" personality traits: Neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. This inventory provides measures on a total of twenty subscales. Correlational analyses comparing the NEO five-factor inventory with the emotional creativity scale indicate that people who are emotionally creative are not neurotic. They are open to new experiences, especially emotional experiences, and they are warm and agreeable. This is true of both males and females, although females tend to score slightly higher on the emotional creativity scale. This may be due to society's greater acceptance of emotional expression in females.

Current Work on Emotional Creativity

The two studies presented in this thesis are further explorations into the nature of emotional creativity, and the validity of the tools which are used to assess it. Both examine the responses of subjects who had been pretested on an abridged version of the emotional creativity scale. These subjects performed tasks that are presumed to require emotional creativity.

The ability to communicate emotions effectively is one aspect of emotional creativity. Because Averill and Thomas-Knowles (1991) had already examined the ability of subjects to verbally communicate combinations of emotions, I wanted to give subjects the opportunity to communicate emotions non-verbally. Each of the
studies involves a verbal task and a non-verbal task. The tasks involve depictions of emotions, combinations of emotions, or resolutions of emotionally conflicting events. Because these tasks all require the subject to look at emotions in a novel way, and to communicate the emotions effectively and authentically, it was presumed that these tasks would tap emotional creativity.
CHAPTER 2

STUDY I: DRAWING ON YOUR EMOTIONAL PAST

Overview

Subjects completed two tasks presumed to indicate emotional creativity: The pictorial depiction of various emotions and the writing of narratives about emotional events which they had experienced or could imagine experiencing. These tasks require the same traits (novelty, effectiveness and authenticity) that are measured by the abridged emotional creativity inventory. I predicted that subjects scoring high on the inventory would perform better on these tasks.

Method

Subjects

Approximately eight hundred introductory psychology students completed the abridged emotional creativity inventory (see Appendix A) as part of a larger survey. Subjects whose scores fell at least one standard deviation above or below the mean were called to participate in the study. Subjects with extreme scores were used because no firm predictions had been made about the size of the effect. This study was considered to be exploratory, and I wanted to increase the chance of finding correlations. Correlational analyses carried out on these data were non-parametric, therefore the selection of extreme subjects should not have affected the magnitude of observed effects.

Approximately two-thirds of the subjects contacted agreed to be in the study. A total of fifty-one subjects who met the criteria participated in the study:
Twenty-nine scoring at least one standard deviation above the mean (thirteen males, sixteen females) and twenty-two scoring at least one standard deviation below the mean (eight males, fourteen females).

Abridged Emotional Creativity Inventory

An abridged version of the emotional creativity inventory (Averill, 1993) was used for prescreening. Score for the inventory is the sum of the fourteen non-filler items on the test. This abridged version has high internal reliability ($\alpha = 0.89$), and is correlated with the full (30 item) version of the test ($r = 0.86$). A copy of the inventory is given in Appendix A.

It may be noted that no items on the abridged emotional creativity inventory are negatively worded. Because of the complex nature of the items, reverse wording of items had proven to be confusing to subjects completing earlier versions of the inventory. Although response bias has been an enduring concern in psychological research, the potential confounding due to the lack of negatively worded items is not considered to be a major problem in this case as such bias is most likely to influence dichotomous judgments, not rating scales (Schreisheim & Hill, 1981).

Emotional Creativity Tasks

Subjects completed two tasks designed to assess emotional creativity, one non-verbal and one verbal. Subjects were not specifically instructed to perform the tasks creatively, as one of the facets of emotional creativity under examination is the likelihood of spontaneous creativity.
Differences have been found in tests of cognitive creativity between groups of subjects who have been told to "be creative" and those who have not (e.g. Harrington, 1975; Katz & Poag, 1979). Correlations between performance on divergent thinking tasks and a creativity measure derived from an adjective checklist were greater when subjects were told to "be creative" than when they were given no such instructions (Harrington, 1975). I opted not to use explicit verbal instructions because in real life emotional situations, individuals are rarely told to "be creative," and I wanted the experiment to simulate a real life emotional situation as closely as possible, given the constraints of the laboratory.

**Emotional Drawings**

For the non-verbal task, subjects drew pictures of five emotions: Anger, joy, desperation, hope and shyness. Each subject was given a box of 34 different colored crayons with which to draw the pictures. No instructions were given as to how the emotion was to be depicted. Each subject was given five pieces of paper, one at a time, with the following instructions: "Please turn this piece of paper over and draw the emotion `<EMOTION NAME>` on the other side." The order of emotions was not randomized, as pilot subjects found anger and joy to be the easiest emotions to draw without a warm-up and differences between emotions were not of interest in this study. Subjects were allowed five minutes to complete each picture. To prevent the subjects from rushing through the task, they were not allowed to hand in the pictures until the full time had elapsed.
Two judges with art studio experience rated the drawings. These judges were blind to the subjects’ scores on the emotional creativity inventory. For exploratory purposes, a variety of elements were rated.

Eight subjective elements were rated by the two judges on a scale of one to five:
1. technical artistic ability (used as a control for technical expertise);
2. how figurative (as opposed to abstract) the picture was;
3. how much of a story the picture told;
4. creative use of color;
5. creative use of space;
6. humor;
7. appropriateness of the drawing to the emotion;
8. complexity.

Two additional objective elements were assessed:
9. number of colors used, which ranged from 1 to 20;
10. whether written words were incorporated into the picture, scored as 0 (no words) or 1 (words).

It was originally planned that the judges would give scores for overall emotional creativity. At the request of the raters this element was dropped. The raters found it difficult to assess emotional creativity as something distinct from all the other elements. In a sense, no emotional creativity was "left over" after the other elements had parcelled out the creativity in the picture.
Scores for these ratings violated the assumptions of normality and homogeneity of variance between raters. Under the circumstances, I did not think that parametric tests were appropriate. The correlation co-efficients cited below are Spearman's correlation co-efficients. Spearman's rho (rₚ) is calculated in the same way as the more commonly used Pearson's product movement co-efficient (r), except that the calculations are carried out on rank-ordered data rather than raw scores. "Words" is a dichotomous variable, therefore rank ordering is inappropriate. Raw data for this variable was used for point-biserial correlations with the rank-ordered variables.

Table 1 (page 18) presents reliabilities between raters and across emotions. Two variables, "appropriateness" and "humor," were dropped due to low interrater reliabilities.

Interrater reliability on the six remaining subjective scales ranged from .30 to .80 with a mean of .50. Cronbach's α for individual elements (across emotions) ranged from .63 to .87, with a mean of .77. Scores for each element were averaged over raters and over emotions.

Narratives

For the verbal task, subjects related three emotionally significant events: The start of college, their first serious relationship, and an open-ended question in which they picked a significant event from their past or their imagination. Because pilot subjects found it easier to select an event for the open-ended question after having answered for two other events, the order of events was not randomized.
## Table 1

Interrater reliabilities ($r_\text{i}$) for emotional drawings

**Study 1**

<table>
<thead>
<tr>
<th>Element</th>
<th>Anger</th>
<th>Joy</th>
<th>Desperation</th>
<th>Hope</th>
<th>Shyness</th>
<th>Inter-Emotion</th>
<th>Alpha</th>
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<tbody>
<tr>
<td>Technical Ability</td>
<td>.44</td>
<td>.42</td>
<td>.30</td>
<td>.53</td>
<td>.45</td>
<td>.81</td>
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<tr>
<td>Figurative</td>
<td>.80</td>
<td>.51</td>
<td>.80</td>
<td>.38</td>
<td>.68</td>
<td>.87</td>
<td></td>
</tr>
<tr>
<td>Tells a story?</td>
<td>.65</td>
<td>.54</td>
<td>.57</td>
<td>.41</td>
<td>.51</td>
<td>.78</td>
<td></td>
</tr>
<tr>
<td>Use of Color</td>
<td>.53</td>
<td>.47</td>
<td>.45</td>
<td>.38</td>
<td>.41</td>
<td>.77</td>
<td></td>
</tr>
<tr>
<td>Use of Space</td>
<td>.65</td>
<td>.57</td>
<td>.51</td>
<td>.39</td>
<td>.53</td>
<td>.75</td>
<td></td>
</tr>
<tr>
<td>Humor(^1)</td>
<td>.59</td>
<td>.30</td>
<td>.35</td>
<td>.37</td>
<td>.15</td>
<td>.61</td>
<td></td>
</tr>
<tr>
<td>Appropriateness(^1)</td>
<td>.12</td>
<td>.29</td>
<td>.37</td>
<td>.47</td>
<td>.42</td>
<td>.25</td>
<td></td>
</tr>
<tr>
<td>Complexity</td>
<td>.33</td>
<td>.50</td>
<td>.38</td>
<td>.41</td>
<td>.35</td>
<td>.63</td>
<td></td>
</tr>
<tr>
<td># of Colors(^2)</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Use of Words(^2)</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>.76</td>
<td></td>
</tr>
</tbody>
</table>

1. Due to low reliability, these elements were dropped from further analysis.

2. These are objective elements, hence inter-rater reliability was not significantly different from one. Where there were disagreements on the number of colors, raters simply re-counted.

Subjects were given five questions about the nature of each event and their responses to it:

1) Describe the event

2) What was happening in your life at this time?

3) What emotions did you experience?
4) What made the experience unique?

5) What did you learn, or how did you change?

Subjects were allowed twenty minutes to answer the questions for each event. To prevent subjects from rushing through the questions, they were not allowed to hand in the answers until the twenty minutes had elapsed. Verbatim instructions for this task, as presented to subjects, are given in Appendix B.

Two judges rated each narrative. These judges were blind to the subjects’ scores on the emotional creativity inventory. For exploratory purposes, a variety of elements were rated:

1. overall emotional creativity;
2. how positive the event was;
3. how positive the outcome was;
4. humor;
5. amount of detail;
6. complexity;
7. appropriateness of the emotional response;
8. writing ability (used as a control for technical expertise).

All of these were rated on a scale of one to five.

These ratings were also rank-ordered, for the same reasons that the picture ratings were rank-ordered, and all analyses were carried out on the ranked data.

As shown in Table 2 (page 20), interrater reliability was extremely low (r, ranged from -.13 to .68 with a mean of .30), especially on the college narratives (r,
ranged from -.13 to .28, with a mean of .13). Reliabilities on the college narratives were so low that these narratives were deemed unusable except as a warm-up exercise. The love narratives and the open-ended narratives were rated by two new judges.

Table 2
Interrater reliabilities (r,) for narratives
Study 1 (First ratings)

<table>
<thead>
<tr>
<th>Element</th>
<th>College</th>
<th>Love</th>
<th>Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Emot. Creativity</td>
<td>.28</td>
<td>.36</td>
<td>.41</td>
</tr>
<tr>
<td>Event (how positive)</td>
<td>.17</td>
<td>.28</td>
<td>.46</td>
</tr>
<tr>
<td>Outcome (how positive)</td>
<td>.20</td>
<td>.38</td>
<td>.45</td>
</tr>
<tr>
<td>Humor</td>
<td>.04</td>
<td>.21</td>
<td>.44</td>
</tr>
<tr>
<td>Detail</td>
<td>.24</td>
<td>.50</td>
<td>.68</td>
</tr>
<tr>
<td>Complexity</td>
<td>.14</td>
<td>.33</td>
<td>.44</td>
</tr>
<tr>
<td>Appropriateness</td>
<td>-.13</td>
<td>.17</td>
<td>.34</td>
</tr>
<tr>
<td>Writing Ability</td>
<td>.08</td>
<td>.33</td>
<td>.39</td>
</tr>
<tr>
<td>Maximum</td>
<td>.28</td>
<td>.50</td>
<td>.68</td>
</tr>
<tr>
<td>Minimum</td>
<td>-.13</td>
<td>.17</td>
<td>.34</td>
</tr>
<tr>
<td>Mean</td>
<td>.13</td>
<td>.32</td>
<td>.45</td>
</tr>
</tbody>
</table>

These judges were given more thorough training in rating the narratives, and they rated the narratives on only four elements:

1. Novelty;
2. Effectiveness;
3. authenticity; and
4. overall creativity.

These elements are described in detail in the earlier discussion of creativity. As with the first set of ratings, these data were rank ordered before analysis.

Table 3 (below) presents reliabilities between raters and across elements. Interrater reliability ranged from .37 to .63 with a mean of .45. Scores were averaged over raters within elements.

<table>
<thead>
<tr>
<th>Element</th>
<th>Love</th>
<th>Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novelty</td>
<td>.38</td>
<td>.57</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>.38</td>
<td>.41</td>
</tr>
<tr>
<td>Authenticity</td>
<td>.37</td>
<td>.63</td>
</tr>
<tr>
<td>Overall Creativity</td>
<td>.40</td>
<td>.43</td>
</tr>
<tr>
<td>Composite Score</td>
<td>.50</td>
<td>.54</td>
</tr>
<tr>
<td>Alpha over elements</td>
<td>.92</td>
<td>.93</td>
</tr>
</tbody>
</table>

As shown in Table 4 (page 22), pairwise correlations between individual elements were moderate (r, ranged from .54 to .91), with novelty, effectiveness and authenticity being more highly correlated with the overall creativity score than
with each other. This was expected, as the raters had been instructed to look at emotional creativity as a function of the three other elements.

Table 4

Correlations (r_s) between individual elements of narratives
Study 1

<table>
<thead>
<tr>
<th></th>
<th>Novelty</th>
<th>Effectiveness</th>
<th>Authenticity</th>
<th>Overall Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LOVE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Novelty</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td>.61</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Authenticity</td>
<td>.77</td>
<td>.54</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>.90</td>
<td>.76</td>
<td>.83</td>
<td>1.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Novelty</th>
<th>Effectiveness</th>
<th>Authenticity</th>
<th>Overall Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OPEN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Novelty</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td>.67</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Authenticity</td>
<td>.74</td>
<td>.64</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>.91</td>
<td>.85</td>
<td>.86</td>
<td>1.00</td>
</tr>
</tbody>
</table>

All p’s < .0001

Considering the four elements as individual indicators of emotional creativity yielded a reliable measure (Cronbach’s α = .92 and .93 for the love narratives and the open-ended narratives respectively). Elements were averaged
giving a composite creativity score for each narrative. Correlation between the love narrative and the open-ended narrative was small ($r_s = .09$, n.s.), so scores were not averaged over narratives.

**Procedure**

The subjects were run in small groups of two to eight. The experimenter handed out stimulus materials for the first emotional creativity task. Although the items within the tasks were not randomized, half the subjects completed the drawings first and half completed the events first.

In the drawing task, subjects completed each drawing before receiving the emotion for the next drawing. The experimenter collected drawings from the subjects as they were completed. In the narratives task, subjects completed each event before being given the questions for the next event. The experimenter collected stimulus materials and responses for each event as they were completed.

Total time for the study was approximately ninety minutes. At the end of this time, the experimenter collected the materials for the final task and debriefed the subjects.

**Results**

**Analyses**

As stated earlier, all statistics were calculated using rank-ordered data. Because there were differences due to sex of subject in both tasks and for technical ability in the drawings task, partial correlations were carried out. There were no effects due to the order in which the tasks were performed. Corrections
were made for the unreliability of the abridged emotional creativity inventory and the ratings on the elements. Because there are no standard significance tests for corrected correlations, I have used uncorrected correlations in the following discussion. Corrected correlations are presented in the tables, for the interested reader.

All calculations were carried out using SAS version 6.07. The main procedures used were proc means, proc rank, proc corr, proc factor and proc glm.

Emotional Creativity Tasks

Emotional Drawings

A principal component factor analysis was performed on the eight elements. Two factors had eigenvalues greater than one. These two factors accounted for 69% of the variance. These factors were rotated (varimax) yielding the loadings presented in Table 5 (page 25).

Four elements (number of colors, use of color, use of space and complexity) loaded onto a visual complexity factor. The other three elements (use of words, figurativeness and story) loaded onto a narrative literalness factor. Two composite scores were formed by averaging the scores on the subjective elements that loaded onto each factor. Because number of colors (which ranged from one to twenty) and use of words (which took on values of zero or one) were scaled differently from the subjective scores (which ranged from one to five), they were not included in the composite scores. Loadings on the two factors were not changed significantly by eliminating these two variables. Thus, the visual
complexity score is the average of the use of color, use of space and complexity scores; and the narrative literalness score is the average of the figurativeness and story scores. Analyses were carried out on individual elements, as well as these two composite scores.

---

Table 5

Factor loadings for elements of drawings
Study 1

<table>
<thead>
<tr>
<th></th>
<th>Factor 1 Visual Complexity</th>
<th>Factor 2 Narrative Literalness</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Colors</td>
<td>0.81687</td>
<td>0.14959</td>
</tr>
<tr>
<td>Use of Words</td>
<td>-0.22783</td>
<td>0.63978</td>
</tr>
<tr>
<td>Figurative</td>
<td>-0.16041</td>
<td>0.87780</td>
</tr>
<tr>
<td>Tells a story?</td>
<td>0.03553</td>
<td>0.93555</td>
</tr>
<tr>
<td>Use of Color</td>
<td>0.84795</td>
<td>-0.39592</td>
</tr>
<tr>
<td>Use of Space</td>
<td>0.69503</td>
<td>-0.23741</td>
</tr>
<tr>
<td>Complexity</td>
<td>0.78047</td>
<td>-0.12475</td>
</tr>
</tbody>
</table>

As shown in Table 6 (page 26), subjects who scored low on emotional creativity were more narratively literal with their pictures ($r_s = -0.34$, $p < .05$). They were more likely to rely on figurative forms ($r_s = -0.31$, $p < .05$), and to tell a story with the picture ($r_s = -0.33$, $p < .05$). For example, one subject who scored quite low on the emotional creativity inventory depicted anger by drawing a stick figure being hanged. Several other stick figures are shown watching the hanging,
and one is laughing. At the top of the picture is written "PUBLIC HANGING FOR LAW BREAKERS" (See Appendix C).

---

### Table 6

Correlations ($r_s$) between ratings on drawings and score on abridged emotional creativity inventory; controlling for technical ability and sex of subject

<table>
<thead>
<tr>
<th>Element</th>
<th>$r_s$ with inventory</th>
<th>Corrected for ability</th>
<th>Corrected for unreliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Colors</td>
<td>.12</td>
<td>.04</td>
<td>.04</td>
</tr>
<tr>
<td>Use of Words</td>
<td>-.36**</td>
<td>-.24</td>
<td>-.26</td>
</tr>
<tr>
<td>Figurative</td>
<td>-.30’</td>
<td>-.31’</td>
<td>-.36</td>
</tr>
<tr>
<td>Tells a story?</td>
<td>-.34’</td>
<td>-.33’</td>
<td>-.35</td>
</tr>
<tr>
<td>Use of Color</td>
<td>.45**</td>
<td>.37**</td>
<td>.41</td>
</tr>
<tr>
<td>Use of Space</td>
<td>.37**</td>
<td>.32’</td>
<td>.34</td>
</tr>
<tr>
<td>Complexity</td>
<td>.21</td>
<td>.06</td>
<td>.06</td>
</tr>
<tr>
<td>Visual Complexity</td>
<td>.41**</td>
<td>.32’</td>
<td>.34</td>
</tr>
<tr>
<td>Narrative Literalness</td>
<td>-.34’</td>
<td>-.34’</td>
<td>-.37</td>
</tr>
</tbody>
</table>

$n = 51$ * $p < .05$ ** $p < .01$

---

The drawings of subjects who scored high on the emotional creativity inventory were more visually complex ($r_s = .32$, $p < .05$). These subjects showed more creative use of color ($r_s = .37$, $p < .01$) and space ($r_s = .32$, $p < .05$). They were also more likely to use symbolic representations of the emotions. One
subject who scored quite high on the inventory depicted hope by drawing a heart locked in a large chest, with a key in the lock (See Appendix C).

Table 7 (below) shows correlations separated by sex. Means for high and low scorers on the inventory, separated by sex, are presented in Table 8 (page 28) to give the reader an indication of the magnitude of the difference between groups. Correlations tend to be higher for females than for males. In other words, the drawings of the females are more affected by their emotional creativity level.

<table>
<thead>
<tr>
<th>Table 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlations ($r_\text{e}$) between ratings on drawings and score on abridged emotional creativity inventory; by sex</td>
</tr>
<tr>
<td>Study 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Element</th>
<th>Male (n = 21)</th>
<th>Female (n = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Observed</td>
<td>Corrected for unreliability</td>
</tr>
<tr>
<td>No. of Colors</td>
<td>.38</td>
<td>.39</td>
</tr>
<tr>
<td>Use of Words</td>
<td>-.35</td>
<td>-.36</td>
</tr>
<tr>
<td>Figurative</td>
<td>-.30</td>
<td>-.32</td>
</tr>
<tr>
<td>Tells a story?</td>
<td>-.36*</td>
<td>-.37</td>
</tr>
<tr>
<td>Use of Color</td>
<td>.40*</td>
<td>.44</td>
</tr>
<tr>
<td>Use of Space</td>
<td>.25</td>
<td>.29</td>
</tr>
<tr>
<td>Complexity</td>
<td>.07</td>
<td>.09</td>
</tr>
<tr>
<td>Visual Complexity</td>
<td>.24</td>
<td>.25</td>
</tr>
<tr>
<td>Narrative Literalness</td>
<td>-.35</td>
<td>-.36</td>
</tr>
</tbody>
</table>

* $p < .05$  ** $p < .01$
Table 8
Mean ratings on drawings for high and low scorers on emotional creativity inventory; by sex
Study 1

<table>
<thead>
<tr>
<th>Element</th>
<th>High Creativity</th>
<th>Low Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male n = 13</td>
<td>Female n = 16</td>
</tr>
<tr>
<td></td>
<td>Male n = 8</td>
<td>Female n = 14</td>
</tr>
<tr>
<td>No. of Colors</td>
<td>4.5</td>
<td>4.6</td>
</tr>
<tr>
<td>Use of Words¹</td>
<td>.19</td>
<td>.09</td>
</tr>
<tr>
<td>Figurative</td>
<td>3.7</td>
<td>3.7</td>
</tr>
<tr>
<td>Tells a story?</td>
<td>2.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Use of Color</td>
<td>2.3</td>
<td>2.2</td>
</tr>
<tr>
<td>Use of Space</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>Complexity</td>
<td>2.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Vis. Complexity</td>
<td>2.4</td>
<td>2.4</td>
</tr>
<tr>
<td>Narr. Literalness</td>
<td>3.0</td>
<td>3.0</td>
</tr>
</tbody>
</table>

¹ Given as the proportion of subjects who used words.

The judges had a difficult time teasing apart emotional and artistic creativity. Subjects with good artistic technique had an advantage over poor artists as they were generally able to communicate the emotions more clearly simply because they could draw better. In this study, partial correlations were used to try to control for these differences due to expertise. This may not have been sufficient to account for artistically talented subjects’ ability to portray emotions more clearly and effectively. To further control for these differences, in the
second study subjects made collages. Collages are presumed to be less affected by artistic talent than drawings.

Narratives

As shown in Table 9 (below), the composite creativity score for the love narrative was correlated with the score on the emotional creativity inventory \( (r_s = .49, p < .005) \). The composite creativity score for the open-ended narrative, in which subjects were allowed to select any event from the past or their imagination, was only slightly (and non-significantly) correlated with score on the emotional creativity inventory \( (r_s = .10, \text{n.s.}) \). Table 10 (page 30) shows correlations separated by sex, and Table 11 (page 30) shows mean scores for high and low scorers on the inventory, separated by sex.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Controlling for sex</th>
<th>Correcting for unreliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Love</td>
<td>.30*</td>
<td>.49**</td>
</tr>
<tr>
<td>Open</td>
<td>.21</td>
<td>.10</td>
</tr>
</tbody>
</table>

\( n = 51 \)  \* \( p < .05 \)  \** \( p < .005 \)
Table 10

Correlations ($r_*$) between ratings on narratives and score on abridged emotional creativity inventory, by sex
Study 1

<table>
<thead>
<tr>
<th>Topic</th>
<th>Male (n = 21)</th>
<th>Female (n = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Observed</td>
<td>Correcting for unreliability</td>
</tr>
<tr>
<td>Love</td>
<td>.30</td>
<td>.32</td>
</tr>
<tr>
<td>Open</td>
<td>.04</td>
<td>.04</td>
</tr>
</tbody>
</table>

Table 11

Mean ratings on narratives for high and low scorers on emotional creativity inventory, by sex
Study 1

<table>
<thead>
<tr>
<th>Topic</th>
<th>High Creativity</th>
<th>Low Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male n = 13</td>
<td>Female n = 16</td>
</tr>
<tr>
<td>Love</td>
<td>2.8</td>
<td>2.6</td>
</tr>
<tr>
<td>Open</td>
<td>2.9</td>
<td>2.8</td>
</tr>
</tbody>
</table>

Correlations for both sexes were approximately equal for the love narratives ($r_{\text{MALE}} = .30$, $r_{\text{FEMALE}} = .31$; these correlations are not significant, due
to the small n for these analyses). This was not the case for the open ended narratives. For these narratives, female performance was more strongly correlated with score on the inventory \((r_s = .26)\) than male performance \((r_s = .04)\), though neither correlation reaches statistical significance. This mirrors the pattern of results seen in the drawing task, where females’ score on the inventory were more highly correlated with performance on the task than males’ scores were.

The nature of the open-ended narrative varied greatly, with some subjects writing about the death of a family pet, and others writing about losing a child. The love narratives were less variable in terms of the nature of the event. Almost all subjects were in their late teens or very early twenties, and most had not had extensive experience with romantic relationships. See Appendix D for sample narratives from subjects who scored high or low on the abridged inventory.

It seems likely that variability in life experience obscured differences due to emotional creativity, especially in the open-ended narrative. To control for the effect of the event, in the second study all subjects wrote an ending to the same scenario. Thus differences were due to creative responses to the event, rather than unusualness of the event itself.

To examine the relation between emotional creativity and its component elements, the three component elements (novelty, effectiveness and authenticity) were regressed on the overall emotional creativity score (which was scored separately from the components). The distribution of the F-statistic is fairly resilient to departures from normalcy by the dependent and independent
variables. Therefore, the regression was carried out on the raw scores, rather than the rank-ordered data that was used for correlational analyses. Although the independent variables in these analyses (novelty, effectiveness and authenticity) are moderately correlated, these correlations are not high enough for collinearity to be a problem. Tolerances are all greater than 0.15.

Table 12 (page 33) presents regression tables for both narratives. The regression is significant for both narratives (F(3,47) = 258.40, p < .0001 for the love narrative, and F(3,47) = 500.06, p < .0001 for the open-ended narrative). All three components contribute to overall creativity for both the love narratives (all t's > 5, all p's < .0001) and the open-ended narratives (all t's > 6, all p's < .0001). The model provides an excellent fit for the data, as overall creativity scores are highly correlated with the component elements (R² = .95 and .98 for the love narrative and the open-ended narrative respectively).
Table 12
Regression table for component elements of emotional creativity (novelty, effectiveness and authenticity) on overall creativity of narratives
Study 1

Love Narratives

\[ F(3,47) = 258.40, \ p < .0001 \]  \[ R^2 = .95 \]

<table>
<thead>
<tr>
<th>Component Element</th>
<th>Beta Coefficient</th>
<th>S.E of Coefficient</th>
<th>t-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTANT</td>
<td>-0.07</td>
<td>0.10</td>
<td>-0.73*</td>
</tr>
<tr>
<td>Novelty</td>
<td>0.41</td>
<td>0.06</td>
<td>6.46</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>0.26</td>
<td>0.04</td>
<td>5.87</td>
</tr>
<tr>
<td>Authenticity</td>
<td>0.33</td>
<td>0.05</td>
<td>6.20</td>
</tr>
</tbody>
</table>

Open Narratives

\[ F(3,47) = 500.06, \ p < .0001 \]  \[ R^2 = .98 \]

<table>
<thead>
<tr>
<th>Component Element</th>
<th>Beta Coefficient</th>
<th>S.E of Coefficient</th>
<th>t-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTANT</td>
<td>-0.17</td>
<td>0.06</td>
<td>-2.24**</td>
</tr>
<tr>
<td>Novelty</td>
<td>0.44</td>
<td>0.04</td>
<td>10.58</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>0.37</td>
<td>0.04</td>
<td>10.34</td>
</tr>
<tr>
<td>Authenticity</td>
<td>0.20</td>
<td>0.03</td>
<td>6.36</td>
</tr>
</tbody>
</table>

All p values < .0001 except * p > .25  ** p < .05
CHAPTER 3

STUDY II: PUTTING THE PIECES TOGETHER

Overview

This study attempted to replicate findings from the first study linking scores on the abridged emotional creativity inventory with performance on tasks presumed to indicate emotional creativity. Attempts were made to control for some of the confounding variables in the first study (e.g. artistic talent, type of events experienced). Trait measures of other types of creativity (artistic and cognitive) were also utilized to explore emotional creativity's relation to other types of creativity.

Subjects performed two tasks: The creation of a collage combining three emotions, and the completion of a story involving conflicting emotional needs. The subjects also completed two inventories to assess other types of creativity: A version of the full emotional creativity inventory (Averill, 1993), which was modified to measure both cognitive and emotional creativity; and the Barron-Welsh art scale (Welsh, 1959), an 86-item preference scale designed to assess artistic sensibility.

I predicted that subjects who scored high on the abridged emotional creativity inventory would perform better on the emotional creativity tasks. Because various forms of creativity have been shown to be related to one another (see e.g. Barron, 1955; Barron & Harrington, 1981; Foster, 1971), I predicted that
subjects who scored high on the abridged emotional creativity inventory would also score high on the other creativity measures.

I had also intended to explore the effect of mood on emotional creativity. Several studies on artistic and cognitive creativity have shown these forms of creativity to be positively correlated with mildly positive mood (e.g. Greene & Noice, 1988; Holden, 1986; Isen, Daubman & Nowicki, 1987; Richards & Kinney, 1990). Work linking creativity to bipolar disorder (Andreasen, 1986) also suggests that creativity is greatest during mildly manic stages. This lends further credence to the theory that positive mood increases creativity.

I predicted that happy mood would lead to better performance than a neutral mood on all tasks for all subjects. Prior studies (e.g. Greene & Noice, 1988) have suggested that sad mood decreases cognitive creativity. I predicted that mean performance on the creativity tasks would be lowest in the sad condition. Insofar as emotional creativity is effective, it may be useful as a mechanism for coping with adversity. This conception of emotional creativity as a coping mechanism suggests that it may be useful in combatting negative mood. Therefore, I predicted an interaction between emotional creativity and mood. Specifically, I predicted that highly emotionally creative subjects would be more creative in the sad condition than in the neutral condition, whereas the less emotionally creative subjects would be less creative in the sad condition than in the neutral condition.
Method

Subjects

Approximately nine hundred introductory psychology students completed the abridged emotional creativity inventory (see Appendix A) as part of a larger survey. Subjects whose scores fell at least one standard deviation above or below the mean were called to participate in the study. As in the first study, subjects with extreme scores were chosen to amplify any correlations. Correlational analyses carried out on these data were non-parametric, therefore the selection of extreme subjects should not have affected the magnitude of observed effects.

Almost all of the subjects contacted agreed to be in the study. A total of one-hundred-fifteen subjects who met the criteria participated in this study: Fifty-six scoring at least one standard deviation above the mean (twenty-six males, thirty females) and fifty-nine scoring at least one standard deviation below the mean (thirty-five males, twenty-four females).

Mood Manipulation and Assessment

Many commonly used mood manipulations (e.g. the Velten (1968) technique) have strong demand characteristics. If subjects are made aware that they are expected to feel (or think about feeling) happy or sad, performance on emotional tasks may be affected. The use of verbal stimuli as an induction was of particular concern, as one of the emotional creativity tasks is verbal in nature, and I did not wish to prime subjects on any specific emotion words.
This study used music to manipulate mood. This has been shown to be effective in past studies (for a review, see Clark, 1983). Music has been used to induce happiness and despondency; and has been shown effective on a wide range of subjects. Kenealy (1988) has indicated that music can be used to induce mood without explicitly communicating to subjects to "work at getting into the mood."

Three mood manipulation tapes were recorded, yielding approximately one hour's worth of music for each condition. Each tape is composed of several pieces ranging in length from three to thirty minutes. As much as possible, the music was taken from a diversity of styles to prevent habituation. To assure that subjects would attend to the music during the study, they rated the music on several dimensions at different points during the study. To avoid priming subjects on specific emotions, dimensions were picked which were not emotionally laden (e.g. mobile-still). See Appendix E for the list of music, and Appendix F for a sample music evaluation sheet.

To assure a wide variety of music, I wanted to garner suggestions from as many different people as possible. I was able to reach a wide audience through the Internet. The Internet is an international computer network that reaches millions of people worldwide, and includes thousands of newsgroups that span a wide range of academic, social, scientific and recreational interests. I posted a request to eleven newsgroups that are dedicated to various types of music, in which I asked people to send me suggestions of pieces that inspire them to feel happy, sad or neutral. I received replies from over a 100 people: more than 750 suggestions. Pieces that were suggested by more than two people, or that had been shown to be effective in previous studies were selected for piloting. The pieces that were most consistent in generating the desired mood were selected for inclusion in the experiment. Pieces used ranged from the Hoedown from Copland's "Rodeo" (for the happy condition) to Eno's "Music for Airports" (for the neutral condition) to Albinoni's "Adagio for Strings in B-flat Minor" (for the sad condition).
Total time for the tasks was approximately fifty minutes. J. Barling (personal communication, December 22, 1992) has been able to successfully manipulate mood via music for that period of time. Two manipulation checks were used.

**Mood Adjective Checklist**

This checklist consists of twenty mood adjectives arrayed on five-point scales (*Not at all* to *Very definitely*). See Appendix G. The critical items are four positive adjectives (joyful, elated, happy and exhilarated) and four negative adjectives (sad, blue, depressed and sorrowful). Ratings on each of these sets of four adjectives were averaged to provide overall ratings of positive and negative mood. These scores did not violate assumptions of normality, and so all statistics presented on mood scores are parametric.

As shown in Table 13 (page 39), the correlations between the happy scale and the sad scale changed over the course of the experiment. At the start of the experiment, the happy and sad scales were negatively correlated ($r_s = -.31$, $p < .05$), but at the end of the experiment, they were positively correlated ($r_s = .43$, $p < .01$). This was entirely unexpected and is discussed further in the results section. The apparently contradictory nature of the final mood-adjective checklist results made it difficult to judge the effectiveness of the mood manipulation.
Table 13

Correlations (r) of ratings on initial and final mood-adjective checklists

<table>
<thead>
<tr>
<th></th>
<th>Initial</th>
<th></th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Happy</td>
<td>Sad</td>
<td>Happy</td>
</tr>
<tr>
<td>Initial Happy</td>
<td>.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial Sad</td>
<td>-.31*</td>
<td>.88</td>
<td></td>
</tr>
<tr>
<td>Final Happy</td>
<td>.42**</td>
<td>-.14</td>
<td>.89</td>
</tr>
<tr>
<td>Final Sad</td>
<td>-.05</td>
<td>.37*</td>
<td>.43**</td>
</tr>
</tbody>
</table>

Diagonal shows Cronbach’s α for individual scales

* p < .05  ** p < .01

Mood-Congruent Judgment Scale

This scale (Mayer & Hanson, 1993) is a series of twelve questions that ask about positive or negative associations, predictions and probabilities. Cognitions that are congruent with mood are more likely to be accessed, accepted as true or assigned a high likelihood of occurrence (Mayer & Bremer, 1985). The mood-congruent judgment scale (Mayer & Hanson, 1993) asks subjects to give probabilities for pleasant or unpleasant events occurring, to consider associations to pleasant or unpleasant stimuli, and to select pleasant or unpleasant members as prototypical of neutral sets. Subjects in a positive mood tend to come up with more positive associations, while subjects in a negative mood tend to come up with more negative associations.
The twelve items are summed to give an overall mood rating. Split-half reliability is reported by Mayer & Harmon (1993) to be .61. The results from use of the scale in this study were not reliable ($\alpha = .38$), and the summed score was not significantly correlated with the happy scale at the start of the experiment ($r = .03$, n.s.), the sad scale at the start of the experiment ($r = -.13$, n.s.), or the happy scale at the end of the experiment ($r = .14$, $p < $ n.s). There was a small but significant negative correlation with the sad scale at the end of the experiment ($r = -.19$, $p < .05$). Due to the low internal reliability, the scores from the mood-congruent judgment scale were not used as a measure of mood. Some possible causes of this low reliability are discussed in the results section.

Creativity Measures

Subjects completed two tasks designed to assess emotional creativity, one verbal and one non-verbal. They also completed two other measures of trait creativity: The Barron-Welsh art scale, a measure of artistic sensitivity (see Appendix J for sample items from the scale) and a version of the emotional creativity inventory in which half the items had been reworded to refer to cognitive (rather than emotional) creativity (see Appendix K). This last inventory was included to give an indication of the relationship between emotional and cognitive creativity.

Emotional Creativity Tasks

Subjects completed two tasks designed to assess emotional creativity, one non-verbal and one verbal. For the same reasons given in the methods section of
the first study, subjects were not specifically instructed to perform the tasks creatively, as one of the facets of emotional creativity under examination is the likelihood of spontaneous creativity.

Collage creation. For the non-verbal task, subjects created a collage that incorporated the emotions of joy, anger and despair. Each subject was given a large piece of heavy paper and a set of 53 pieces of paper of various colors and sizes. The experimenter told the subjects, "I would like you to create a collage that expresses the emotions joy, anger and despair. The three emotions should all be expressed in the collage as individual emotions, but as much as possible, I'd like you to try to combine the three into a coherent whole. You may use as many or as few of the pieces of paper as you like, and there are no other guidelines as to how you should make the collage. Just do what feels right to you. You will have ten minutes to complete the collage."

These emotions (joy, anger and despair) are approximately 120 degrees apart on Plutchik's emotion circle (1980), indicating a high degree of incongruence. Amabile (1982) has found collages to be an effective method of measuring creativity while controlling somewhat for technical artistic ability. Subjects were allowed ten minutes for completion of the collage. This same set of shapes had been pre-tested by Amabile and her colleagues (H. Coons, personal communication, October 23, 1992), and they had found that this was an appropriate amount of time to allow.
Pretesting indicated that the judges occasionally have difficulty grasping the subjects’ intentions in the collage, which leads to lower reliability on ratings. To alleviate this problem, subjects wrote a short description of the collage on the back.

Two judges with art studio experience rated the collages. These judges were blind to the subjects’ scores on the abridged emotional creativity inventory and to the subjects’ mood condition. Each collage was given a score from one to five by each of the two judges on the elements of novelty, effectiveness, authenticity and overall emotional creativity. As in the first study, these data were rank-ordered before analysis.

Table 14 (page 43) presents reliabilities between raters and across elements. Interrater reliability ranged from .28 to .40 with a mean of .36. Scores were averaged over raters within elements.

As shown in Table 15 (page 44), pairwise correlations between individual elements were moderate (r, ranged from .47 to .85), with novelty, effectiveness and authenticity being more highly correlated with the overall creativity score than with each other.

Considering the four elements as individual indicators of emotional creativity yielded a reliable measure (Cronbach’s α = .91). Elements were averaged giving an overall creativity score for each collage.
Table 14

Interrater reliabilities ($r_i$) for tasks
Study 2

<table>
<thead>
<tr>
<th>Element</th>
<th>Collage</th>
<th>Story</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novelty</td>
<td>.39</td>
<td>.40</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>.28</td>
<td>.49</td>
</tr>
<tr>
<td>Authenticity</td>
<td>.40</td>
<td>.23</td>
</tr>
<tr>
<td>Overall Creativity</td>
<td>.37</td>
<td>.52</td>
</tr>
<tr>
<td>Composite Score</td>
<td>.42</td>
<td>.45</td>
</tr>
<tr>
<td>Alpha over elements</td>
<td>.91</td>
<td>.83</td>
</tr>
</tbody>
</table>

Story completion. For the verbal task, subjects wrote the conclusion to a story involving a specific emotional conflict. The story concerns two dormitory roommates who dislike each other intensely. The mother of one of the roommates commits suicide, and the other roommate discovers this. Subjects related how they felt the characters in the story would react to the situation, and what emotions the characters would experience.

Subjects were allowed eight minutes to complete the story. They were then given a series of more specific questions about the characters and the situation, and allowed an additional seven minutes to answer these. The story that the subjects completed, with follow-up questions, is given in Appendix I.

Two judges rated the stories. Judges were blind to the subjects' score on the abridged emotional creativity inventory and to the subjects' mood condition.
Each story was given a score from one to five by each of the two judges on the elements of novelty, effectiveness, authenticity and overall emotional creativity.

<table>
<thead>
<tr>
<th></th>
<th>Novelty</th>
<th>Effectiveness</th>
<th>Authenticity</th>
<th>Overall Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novelty</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td>.64</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Authenticity</td>
<td>.47</td>
<td>.73</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>.85</td>
<td>.82</td>
<td>.72</td>
<td>1.00</td>
</tr>
</tbody>
</table>

STORIES

<table>
<thead>
<tr>
<th></th>
<th>Novelty</th>
<th>Effectiveness</th>
<th>Authenticity</th>
<th>Overall Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novelty</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td>.50</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Authenticity</td>
<td>.25*</td>
<td>.52</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>.68</td>
<td>.75</td>
<td>.69</td>
<td>1.00</td>
</tr>
</tbody>
</table>

All p’s < .0001, except * p < .001

Table 14 (page 43) presents reliabilities between raters and across elements. Interrater reliability ranged from .23 to .52 with a mean of .41. Scores were averaged over raters within elements.
As shown in Table 15 (page 44), pairwise correlations between individual elements were low to moderate ($r$, ranged from .25 to .74), with novelty, effectiveness and authenticity being more highly correlated with the overall creativity score than with each other.

Considering the four elements as individual indicators of emotional creativity yielded a reliable measure (Cronbach’s $\alpha = .83$). Elements were averaged giving an overall creativity score for each story.

Additional Measures

**Barron-Welsh Art Scale.** This is a sub-scale of the Welsh figure preference test (Welsh, 1959). It consists of a set of 86 black and white drawings; subjects indicate whether they like or dislike each one. This test was developed empirically to discriminate between artists and non-artists. Because one of the emotional creativity tasks is artistic in nature, I wanted to get a measure of artistic sensibility in order to tease apart artistic creativity from emotional creativity. This task takes less than ten minutes. Sample figures from the art scale are given in Appendix J. The scale has high internal consistency ($\alpha = .93$ for this sample).

**Emotional/Cognitive Creativity Inventory.** The inventory is comprised of sixteen questions designed to assess emotional creativity, and sixteen to assess cognitive creativity. The emotional creativity items are taken directly from an earlier version of the emotional creativity inventory (Averill, 1993). The cognitive creativity items are based on items from the original inventory, reworded to reflect cognitive (as opposed to emotional) creativity. Scores on this inventory were used
to explore the similarities and differences between emotional and cognitive creativity. Correlation between these two parts of the inventory was quite high ($r = .74$). This may be due to the nature of the method (self-report), to the cognitive component of emotional creativity, or to some combination of the two. Further research is necessary to determine this. The two inventories were combined into one highly reliable ($\alpha = .90$) emotional/cognitive creativity inventory, and the total score on the inventory was used in analysis. A copy of the inventory is given in Appendix K.

**Scholastic achievement.** Students supplied their SAT scores (verbal and math) on the pre-screening.

**Procedure**

Subjects were run in small groups of one to four. The lab was set up so that the subjects could not see one another as they completed the tasks.

Subjects were told that the study explored the relation between perceptions of music and various kinds of creativity. It was explained that they would perform tasks assessing different types of creativity while listening to music, and that they would be asked to give their opinion of the music at several points during the study.

Before the music started, subjects filled out a preliminary mood adjective checklist. After baseline mood was assessed, the music started. The music continued to play for the duration of the experiment. Subjects listened to the music for two minutes and then rated the music on several dimensions. Subjects
rated the music on ten evaluative scales at several points during the study to ensure that they were attending to the music.

After rating the music, subjects completed the first emotional creativity task. Order of tasks was randomized between groups, so that half the subjects did the story first and half did the collage first. Subjects then rated the music again. The music was rated after each emotional creativity task to ensure that subjects attended to the music. It was hoped that this attention to mood-inducing music would attenuate emotional effects of the emotional creativity tasks themselves.

Subjects then completed the Barron-Welsh art scale, and the mood-congruent judgement scale. After these were completed, subjects completed the other emotional creativity task (story completion or collage creation), and rated the music once more. Subjects completed the emotional/cognitive creativity inventory. Final mood was assessed via a final mood-adjective checklist. Materials were collected as each task was completed. After completion of the final mood checklist, the music was turned off and the subjects debriefed.

Results

All calculations were carried out using SAS version 6.07. The main procedures used were proc means, proc ttest, proc rank, proc corr and proc glm.

Mood Manipulation

The mood manipulation was not effective. There were slight differences between conditions, with subjects in the happy condition reporting slightly higher happiness and slightly lower sadness at the end of the experiment; and subjects in
the sad condition reporting slightly higher sadness and slightly lower happiness. Subjects in the neutral condition reported both slightly higher happiness and slightly higher sadness at the end of the study. None of these differences were significant. An ANCOVA on the final happiness and sadness ratings, controlling for initial happiness and sadness, showed no effect of condition ($F(2,112) = 1.64$, n.s. for final happiness rating and $F(2,112) < 1$, n.s. for final sadness rating). See Table 16 (below) for mean happy and sad ratings for all conditions.

<table>
<thead>
<tr>
<th>Mood Scale</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Happy</td>
</tr>
<tr>
<td>Initial Happy</td>
<td>9.9</td>
</tr>
<tr>
<td>Final Happy</td>
<td>10.0</td>
</tr>
<tr>
<td>Mean Change Happy</td>
<td>+0.1</td>
</tr>
<tr>
<td>Initial Sad</td>
<td>7.0</td>
</tr>
<tr>
<td>Final Sad</td>
<td>6.9</td>
</tr>
<tr>
<td>Mean Change Sad</td>
<td>-0.1</td>
</tr>
</tbody>
</table>

Table 16

Mean ratings on mood-adjective checklist by manipulated mood condition
Study 2
The mood ratings themselves were rather interesting. As explained in the reliability section, the final mood ratings were ambiguous, making it difficult to determine the final mood of the subjects. One of the facets of emotional creativity under exploration is the ability to combine conflicting emotions. An ambiguous rating on the mood-adjective checklist may indicate that the subject is feeling something that can be classified as both happy and sad, or neither happy nor sad. This may be a creative combination of emotions, or it may be some emotion that doesn’t fit neatly into either the category happy and not sad, or the category sad and not happy. In either case, this could be considered to be a form of emotional creativity. In order to see if this ability to combine conflicting emotions is a function of emotional creativity, I looked at high scoring subjects and low scoring subjects separately.

Correlations between happy and sad ratings at the beginning and at the end of the study for each group are given in Table 17 (page 50). Both groups had negative correlations at the beginning of the study, with the correlation being significantly stronger for the high creativity subjects (r = -.45 for the high scorers, r = -.17 for the low scorers, z = 2.34, p < .01). This indicates that subjects were either happy or sad, but not both. High creativity subjects showed more consistency in their ratings than low creativity subjects did.

At the end of the study, however, only the low emotional creativity subjects had negative correlations (r = -.23), while the high emotional creativity subjects had positive correlations (r = .68).
These two correlations are significantly different ($z = 7.96, p < .0001$).

The apparently contradictory mood ratings of the high creativity subjects was not a result of filling in the rating scale randomly. The reliability within emotions at the end of the study was higher for the high creativity subjects ($\alpha_{\text{HAPPY}} = .94, \alpha_{\text{SAD}} = .97$) than the low creativity subjects ($\alpha_{\text{HAPPY}} = .77, \alpha_{\text{SAD}} = .92$). That is, subjects who scored high on the emotional creativity scale, and who had completed the experiment, were reporting incongruous emotions. They were apparently feeling both reliably happy and reliably sad, or both reliably not happy and reliably not sad.

---

<table>
<thead>
<tr>
<th></th>
<th>Study 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Happy</td>
</tr>
<tr>
<td>Start</td>
<td>Happy</td>
</tr>
<tr>
<td></td>
<td>Sad</td>
</tr>
<tr>
<td>Finish</td>
<td>Happy</td>
</tr>
<tr>
<td></td>
<td>Sad</td>
</tr>
</tbody>
</table>

Diagonal shows Cronbach's $\alpha$ for individual scales

Correlations with the same subscript are not significantly different
Table 18 (below) shows that the different correlations were not due to
significant differences in mean mood between the two groups. Ratings at the end
of the experiment indicated that both high and low emotional creativity subjects
reported about the same level of happiness ($\text{Mean}_{\text{HIGH}} = 9.89$, $\text{Mean}_{\text{LOW}} = 9.12$,
$t'(91.2) = 0.76$, n.s.) and sadness ($\text{Mean}_{\text{HIGH}} = 8.05$, $\text{Mean}_{\text{LOW}} = 7.10$, $t'(88) =
0.97$, n.s., using Welsh's t-test for groups with unequal variance).

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t</th>
<th>F'</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beginning of Study</strong></td>
<td>High Happy</td>
<td>9.57</td>
<td>3.22</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>Low Happy</td>
<td>9.52</td>
<td>3.28</td>
<td>df=113</td>
</tr>
<tr>
<td><strong>High Sad</strong></td>
<td>7.63</td>
<td>3.65</td>
<td>1.25</td>
<td>1.23</td>
</tr>
<tr>
<td><strong>Low Sad</strong></td>
<td>6.81</td>
<td>3.30</td>
<td>df=113</td>
<td>df=55,58</td>
</tr>
<tr>
<td><strong>End of Study</strong></td>
<td>High Happy</td>
<td>9.89</td>
<td>5.91</td>
<td>0.761</td>
</tr>
<tr>
<td></td>
<td>Low Happy</td>
<td>9.12</td>
<td>3.68</td>
<td>df=91.2</td>
</tr>
<tr>
<td><strong>High Sad</strong></td>
<td>8.05</td>
<td>6.35</td>
<td>0.971</td>
<td>2.90*</td>
</tr>
<tr>
<td><strong>Low Sad</strong></td>
<td>7.10</td>
<td>3.73</td>
<td>df=88</td>
<td>df=55,58</td>
</tr>
</tbody>
</table>

1 Welsh’s t for unequal groups with unequal variance  *  $p < .0005$
High creativity subjects showed significantly more variability in their responses than low creativity subjects (S.D.\text{HIGH} = 5.91, S.D.\text{LOW} = 3.68, F'(55,58) = 2.58, p < .0005 for happy; S.D.\text{HIGH} = 6.35, S.D.\text{LOW} = 3.73, F'(55,58) = 2.90, p < .0001 for sad). That is, the high emotional creativity subjects were reporting the full range of happy and sad ratings. Some were high on both happy and sad ratings, some were low on both happy and sad ratings, and some were in the mid-range. The low emotional creativity subjects tended to report scores towards the middle of the scale, and to report being either slightly happy or slightly sad. In the beginning of the experiment, both groups showed equal mean happiness and variability of happiness (Mean\text{HIGH} = 9.57, S.D.\text{HIGH} = 3.22; Mean\text{LOW} = 9.52, S.D.\text{LOW} = 3.28), and mean sadness and variability of sadness (Mean\text{HIGH} = 7.63, S.D.\text{HIGH} = 3.65; Mean\text{LOW} = 6.81 S.D.\text{LOW} = 3.30).

This change in mood congruity may have been due to the music, to the emotional creativity tasks, or to the repetition of the ratings. Because this effect has not been found in other mood studies that have used music or repeated mood measures, the nature of the tasks seems the most likely candidate for this effect.

The collage specifically required subjects to combine a positive emotion (joy) and negative emotion (despair). Creating the collage may have primed subjects on emotional combinations, and allowed them to experience such combinations personally.

To isolate the effects due to the collage, I looked at the mood-congruent judgment scale, which was completed between the tasks. Differences in reliability
on this scale may have been due to the task which was performed before the scale was completed. As shown in Table 19 (below), reliability was considerably lower for subjects who had completed the collage (α = .24) than for subjects who had completed the story (α = .55). This suggests that the subjects who had completed the collage may have been experiencing a combination of emotions not neatly categorizable as positive or negative by the mood-congruent judgment scale.

Subjects who scored high on the abridged emotional creativity inventory also had lower reliability (α = .36) than those who scored low on the inventory (α = .47). This suggests that the high emotional creativity subjects were having a less stereotypic emotional experience than the low emotional creativity subjects.

<table>
<thead>
<tr>
<th></th>
<th>High creativity</th>
<th>Low creativity</th>
<th>All subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collage</td>
<td>.17</td>
<td>.30</td>
<td>.24</td>
</tr>
<tr>
<td>Story</td>
<td>.48</td>
<td>.61</td>
<td>.55</td>
</tr>
<tr>
<td>All subjects</td>
<td>.36</td>
<td>.47</td>
<td>.38</td>
</tr>
</tbody>
</table>

Analysis of variance tests on ratings for the stories and collages show no main effect from the mood manipulation (F(2,112) = 1.34, n.s. for the stories,
F(2,112)=2.52, n.s. for the collages). Actual mood was difficult to assess, due to the ambiguity of the final mood ratings. Therefore, all data were collapsed over conditions for all analyses; neither manipulated nor observed mood were used as predictors.

Emotional Creativity Tasks

As stated earlier, all correlational statistics were calculated using rank-ordered data. Because there were differences due to sex of subject and to order of tasks, partial correlations were carried out. Correlations corrected for unreliability are included in the tables, but are not used in discussion.

Collage Creation

As shown in Table 20 (page 55), the composite creativity score for the collage was not significantly correlated with the score on the abridged emotional creativity inventory (r = .14, n.s), although the correlation is in the predicted direction. Table 21 (page 56) shows correlations separated by sex, and Table 22 (page 57) shows mean scores for high and low scorers on the inventory, separated by sex and order of tasks. Appendix L shows sample collages from subjects who scored high or low on the abridged emotional creativity inventory. Although females’ scores on the inventory show a slightly higher correlation with performance on tasks than males’ scores do, neither correlation is statistically significant.

Originally the Barron-Welsh score was considered as a possible control for artistic talent. Because no correlations were found between score on the Barron-
Welsh and ratings on the collage ($r_s = .09$, n.s.), this was not feasible. I had hoped that using pre-cut pieces of paper (i.e. collage materials) would prevent technical ability from causing significant differences in collages. Examination of the collages show this to be an erroneous assumption. There were definite differences in artistic technique between collages. The variability due to technique may have obscured variability due to emotional creativity. It is possible that controlling for technical ability would help clarify differences in emotional creativity.

<table>
<thead>
<tr>
<th>Task</th>
<th>$r_s$ with inventory</th>
<th>Controlling for sex &amp; order</th>
<th>Correcting for unreliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collage</td>
<td>.12</td>
<td>.14</td>
<td>.15</td>
</tr>
<tr>
<td>Story</td>
<td>.26</td>
<td>.23*</td>
<td>.25</td>
</tr>
</tbody>
</table>

* $p < .01$

To examine the relation between emotional creativity and its component elements, the three component elements (novelty, effectiveness and authenticity) were regressed on the overall emotional creativity score (which was scored
separately from the components). The distribution of the F-statistic is fairly resilient to departures from normalcy by the dependent and independent variables. Therefore, the regression was carried out on the raw scores, rather than the rank-ordered data that was used for correlational analyses. Although the independent variables in these analyses (novelty, effectiveness and authenticity) are moderately correlated, these correlations are not high enough for collinearity to be a problem. Tolerances are all greater than 0.25.

---

Table 21
Correlations (r,) between ratings on tasks and score on abridged emotional creativity inventory; by sex Study 2

<table>
<thead>
<tr>
<th>Task</th>
<th>Male Observed</th>
<th>Male Controlling for unreliability</th>
<th>Female Observed</th>
<th>Female Controlling for unreliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collage</td>
<td>.12</td>
<td>.13</td>
<td>.20</td>
<td>.21</td>
</tr>
<tr>
<td>Story</td>
<td>.17</td>
<td>.19</td>
<td>.36*</td>
<td>.40</td>
</tr>
</tbody>
</table>

* p < .01

---

Table 23 (page 58) presents regression tables for the tasks. The regression is significant for the collage (F(3,111) = 296.56, p < .0001). All three components contribute to overall creativity (all t's > 4, all p's < .0001). The model provides a
good fit for the data, as overall creativity scores are highly correlated with the component elements ($R^2 = .89$).

<table>
<thead>
<tr>
<th></th>
<th>Collage</th>
<th>Story</th>
</tr>
</thead>
<tbody>
<tr>
<td>H Collage</td>
<td>Male</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.1</td>
</tr>
<tr>
<td>H Story</td>
<td>Male</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>2.9</td>
</tr>
<tr>
<td>H Overall</td>
<td>3.1</td>
<td>3.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Collage</th>
<th>Story</th>
</tr>
</thead>
<tbody>
<tr>
<td>L Collage</td>
<td>Male</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.1</td>
</tr>
<tr>
<td>L Story</td>
<td>Male</td>
<td>2.6</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>2.2</td>
</tr>
<tr>
<td>L Overall</td>
<td>2.6</td>
<td>2.7</td>
</tr>
</tbody>
</table>

**Story Completion**

As shown in Table 20 (page 55), the composite creativity score for the story was correlated with the score on the abridged emotional creativity inventory ($r = .23, p < .05$). Table 21 (page 56) shows correlations separated by sex and order.
of tasks, and Table 22 (page 57) shows mean scores for high and low scorers on the inventory, separated by sex and order of tasks. Females’ scores on the inventory are significantly correlated with ratings on the stories; males’ scores are not. Appendix M shows sample stories from subjects who scored high or low on the abridged emotional creativity inventory.

Table 23

Regression table for component elements of emotional creativity (novelty, effectiveness and authenticity) on overall creativity of tasks

Study 2

<table>
<thead>
<tr>
<th>Component Element</th>
<th>Beta Coefficient</th>
<th>S.E of Coefficient</th>
<th>T-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTANT</td>
<td>-0.09</td>
<td>0.10</td>
<td>-0.02*</td>
</tr>
<tr>
<td>Novelty</td>
<td>0.52</td>
<td>0.04</td>
<td>13.77</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>0.21</td>
<td>0.05</td>
<td>4.64</td>
</tr>
<tr>
<td>Authenticity</td>
<td>0.25</td>
<td>0.05</td>
<td>4.85</td>
</tr>
</tbody>
</table>

F(3,111) = 296.56, p < .0001 R² = .89

<table>
<thead>
<tr>
<th>Component Element</th>
<th>Beta Coefficient</th>
<th>S.E of Coefficient</th>
<th>T-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTANT</td>
<td>-0.21</td>
<td>0.14</td>
<td>-1.51**</td>
</tr>
<tr>
<td>Novelty</td>
<td>0.39</td>
<td>0.05</td>
<td>8.52</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>0.36</td>
<td>0.04</td>
<td>8.82</td>
</tr>
<tr>
<td>Authenticity</td>
<td>0.29</td>
<td>0.05</td>
<td>6.19</td>
</tr>
</tbody>
</table>

F(3,111) = 163.95, p < .0001 R² = .82

All p values < .0001 except * p > .90 ** p > .10
To examine the relation between emotional creativity and its component elements, the three component elements (novelty, effectiveness and authenticity) were regressed on the overall emotional creativity score (which was scored separately from the components). As explained above, this regression was carried out on the raw scores, not the rank-ordered data.

Table 23 (page 58) presents regression tables for the tasks. The regression is significant for the story completion (F(3,111) = 163.95, p < .0001). All three components contribute to overall creativity (all t's > 8, all p's < .0001). The model provides a good fit for the data, as overall creativity scores are highly correlated with the component elements (R² = .82).

Additional Measures

Barron-Welsh Art Scale

Artistic creativity as measured by the Barron-Welsh appears to be related to but distinct from emotional creativity as measured by the abridged inventory (rₛ = .23, p < .05) and the full emotional/cognitive creativity inventory (rₛ = .20, p < .05).

Emotional/Cognitive Creativity Inventory

The score from the inventory was correlated with the score on the prescreening (rₛ = .73, p < .001). Insofar as the emotional/cognitive creativity inventory assesses the same qualities as the abridged inventory, this is an indication of the temporal reliability of the inventory.
Scholastic Achievement

Scores from the verbal and quantitative sections of the Scholastic Achievement Test (SAT) were given by all subjects on the prescreening. The number of subjects at the prescreening (n = 891) was considerably larger than the number involved in the experiment itself (n = 115). Correlations carried out on this large a sample almost always yield significant results, even if the correlation is too small to be of practical interest. A small but significant correlation was found between the abridged emotional creativity and verbal score ($r_s = .10$, $p < .05$). No correlation was found between the abridged emotional inventory and math score ($r_s = .01$, n.s.). Although there is clearly a cognitive component to emotional creativity, there is no reason to assume it to be correlated with academic ability.
CHAPTER 4

GENERAL DISCUSSION

The results from these studies suggest that the aspects of emotional creativity that are tapped by the inventory manifest themselves in other ways. Subjects scoring high on the inventory were more creative when completing verbal and non-verbal tasks that required them to symbolically express emotions in novel, effective and authentic ways.

The drawings, narratives, collages and stories which were rated as emotionally creative were also rated high on the component dimensions of emotional creativity (novelty, effectiveness and authenticity). Responses which were rated as novel were also rated as effective and authentic. This is contrary to earlier studies (e.g. Lovejoy & Steurwald, 1992) that have indicated that non-conforming emotional responses are maladaptive. In the studies presented here, emotionally creative responses, which were novel, were also likely to be effective and authentic. This lends support to the concept of emotional creativity as a unified, though complex, trait.

In both studies, the correlation between scores on the inventory and ratings of performance on the tasks was stronger for females than it was for males. That is, more of the variability in females’ performance was accounted for by emotional creativity. Females have generally scored higher on the emotional creativity inventory than males have (see Averill, 1993). In these studies, I wanted to have an approximately equal number of high and low scoring subjects of each gender.
There were far fewer high scoring males than females - indeed almost all of the males who met the criteria (approximately 20 out of 400 prescreened) were recruited for the second study. These subjects had extremely high emotional creativity scores compared to other males from the same population. Therefore, males in the high emotional creativity cell may have been regressing towards the mean, which would have led to less creative scores among the high scoring males, and lower correlations in the male sample overall.

On the other hand, this difference may be due to something more than the extremity of the male sample pool. It is also possible that there are differences in the way emotional creativity is expressed by males and females. Our culture is traditionally viewed as allowing females greater emotional expression than males. This may lead to females being better able to communicate their personal level of emotional creativity more effectively. This would lead to higher correlations between actual and expressed emotional creativity, as operationalized by the inventory and the tasks respectively.

Perhaps the most interesting finding from these studies is the apparent contradiction in mood at the end of the second study. One of the aspects of emotional creativity is the ability to combine emotions in a novel fashion. Acknowledging conflicting moods may be one step towards novel emotional combinations. Completing the emotional creativity tasks, especially the collage, which deals explicitly with the combination of incongruous emotions, may have primed emotionally creative subjects on emotional combinations. This priming
may have enabled them to experience these apparently contradictory states within themselves. This suggests that emotional creativity may be triggered by external events, and may be a learnable talent.

The high correlation between the emotional and cognitive parts of the inventory administered during the second study suggests that there is a strong cognitive component to emotional creativity. If emotional creativity is moderated by cognitive processes, and can be tapped by tasks such as combining emotions in a collage, then it is possible that individuals can learn to be emotionally creative.

Creativity, emotional or otherwise, is useless if it cannot be communicated to others. These studies required subjects to be creative in other domains (artistic and verbal) to communicate their emotions. I do not believe this compromises the validity of the results.

There is a great deal of overlap between various forms of creativity. Creativity in one domain is often correlated with creativity in another (e.g. Barron, 1955; Barron & Harrington, 1981; Foster, 1971). The ability to combine and present ideas is germane to all forms of creativity: emotional, cognitive, artistic, musical, et cetera. A visually complex painting, a rhythmically intricate piece of music, a multi-faceted emotion; all of these require a certain amount of cognitive flexibility on the part of the individual creating or expressing them. Although subjects’ talent and creativity in other domains surely affected performance on the tasks, emotional creativity led to significant differences in most cases. These tasks
may be tapping other talents in addition to emotional creativity, but they appear to be tapping emotional creativity itself as well.

The construct of emotional creativity grows out of the work of James Averill, who views emotions as socially constructed roles (e.g. Averill, 1980, 1985, 1991). For Averill, the emotions available to an individual are a function of the culture in which the individual learned to be emotional. The rules that constitute emotional syndromes differ from culture to culture; therefore the emotions experienced vary from culture to culture. Averill postulates that "emotional syndromes vary across cultures--fundamentally, not just superficially" (1990, p. 396).

My view of emotions is less culture-specific. I believe that all individuals can and do experience the full range of emotional syndromes that are seen around the world. The absence of an emotion term or a generally accepted set of emotional behaviors within a specific culture does not mean that the emotion is not experienced, only that it labeled or expressed differently, or that it is less salient within the culture.

The accepted antecedents and norms for behavior differ from culture to culture. This does not mean that the internal state varies any more between individuals from different cultures than it does between individuals within the same culture. It is difficult to tease apart differences due to language, differences due to cultural norms, and differences due to subjective experience. An emotional
response which is commonplace to a native of New Guinea may be highly novel (and perhaps creative) to an Italian.

One example which is often given as a culture-specific emotion is *liget*, an emotional syndrome experienced by the Ilongot (a people in the Philippines). *Liget* is described as "what makes babies, stirs one onto work, determines killers, gives people strength and courage, narrows vision on a victim or a task" (Rosaldo, 1980, p. 49). It is also described as the feeling an individual experiences after decapitating another.

This is something most Westerners have not experienced, and so it may be difficult for us to imagine the emotional consequences of such an act. In addition, our culture's mores and standards make it aversive for us to even contemplate the emotional ramifications of such an act.

This does not mean that Westerners do not experience the internal state which the Ilongot label *liget*. Although this feeling may have never been experienced in the context of decapitation, it may have occurred under different circumstances, and have been given a different name.

There has been a great deal of interest lately on cross-cultural differences in the expression of emotions (see Mesquita & Frijda, 1992; Russell, 1991, for reviews). Much of the research in this area lends itself to examination in light of emotional creativity.

It may be that some cultures foster emotional creativity, while others encourage emotional conformity. Cultures with large, rich vocabularies of emotion
terms provide their speakers with a greater range of combinations. Ambiguous terms may allow individuals more leeway in interpreting emotions. Some societies have stringent rules as to what behaviors a certain emotion engenders, such as formal rules for grief after the death of a loved one. Other societies allow more private, personalized expression of emotion. Though emotions are expressed differently, it is not necessarily the case that there are differences in internal states.

The internal, subjective experience of emotion is difficult to study because emotions are communicated largely through language. Some branches of linguistic research suggest that we teach our children emotion words (anger, sorrow, joy, et cetera), by observing their behavior and telling them "Oh, you’re crying, you must be sad." Children learn to associate the emotion word with their own internal state. There is no direct access from any observer to the subjective, internal state of the crying child; or from the child to the subjective, internal states of other individuals who are crying. The child learns to label his internal state sorrow, and because he sees other people manifesting the same behavior and saying "I’m sad," he operates on the assumption that others’ internal states are the same as his own (Turski, 1991).

The words we use for various emotions are ill-defined and confusing. These words vary in meaning from individual to individual. One man’s ennui is another man’s weltschmerz. In everyday conversation this is not a great problem, but as psychologists, we need to be specific in our terminology. Because emotion
terms are used loosely by lay people, it is difficult to draw definite lines around them. When we bring people into our laboratories and ask them about their emotions, the words they use may mean different things to them than they do to us. As psychologists, we assume that there is some consistency among the internal states individuals who label these states with the same emotional word. There is no direct way to verify this assumption. We can look at self-reports, but they are subject to the vagaries of language. We can examine physiological responses, but there is no guarantee that these will be experienced affectively in the same way by all people. We can look at the antecedents and consequences of individual emotions, but these do not give us information about the subjective internal state of the individual who is actually experiencing the emotion.

The fact that we cannot directly access the internal subjective experience should not deter us from studying emotion. It is worthwhile to examine the process by which people achieve consensus on emotion. This helps us to understand the nature of emotions - even if we cannot tap into those internal processes - and helps us to examine which methods can best be used to study emotions empirically.

The interpersonal and intercultural differences in the expression of emotions may due to different emotional experiences, or they may be due to different levels of emotional creativity. The construct of emotional creativity may give us a better sense of how emotions differ across cultures, in terms of both expression and experience.
APPENDIX A

EMOTIONAL CREATIVITY INVENTORY (ABRIDGED VERSION)

Rate each of the following statements as it applies to you in comparison with people in general. Be sure to answer all statements as honestly and accurately as possible.
Mark "1" if the statement is much less true of you than of most people.
Mark "2" if the statement is somewhat less true of you than of most people.
Mark "3" if the statement is about the same of you as of most people, or if you cannot decide.
Mark "4" if the statement is somewhat more true of you than of most people.
Mark "5" if the statement is much more true of you than of most people.

1. I prefer a well-written technical book to a good adventure story. (Filler)

2. When I have strong emotional reactions, I search for reasons for my feelings.

3. I like music, dance, and paintings that arouse new and unusual emotional reactions.

4. My emotions help me achieve my goals in life.

5. I like to gossip. (Filler)

6. I try to be honest about my emotional reactions, even when it causes me problems.

7. My emotional reactions are different and unique.

8. I believe people should work on their emotional development as hard as they work on their intellectual development.

9. I consider all sides of an issue before making a judgment. (Filler)

10. I have felt combinations of emotions that other people probably have never experienced.

11. The way I experience and express my emotions helps me in my relationships with others.

12. I can experience a variety of different emotions at the same time.

13. I like the logic and rigor of mathematics. (Filler)
14. I pay attention to other peoples’ emotions so that I can understand my own feelings.

15. I have emotional experiences that would be considered unusual or out of the ordinary.

16. My emotions are almost always an authentic expression of my true thoughts and feelings.

17. I sometimes experience feelings and emotions that cannot be easily described in ordinary language.

18. I have answered all of the above statements honestly, to the best of my knowledge. (Filler)
APPENDIX B

QUESTIONS FOR THE NARRATIVE TASK

Subjects wrote three narratives. Instructions for writing the first narrative are given below:

Think back to when you started college. Was there some specific incident or event that seemed particularly emotionally significant to you?

1) Describe the event. Please mention anything that seems important TO YOU.

2) What was happening in your life at this time?

3) Consider how you felt at the time of the event. You may have experienced new emotions at that time. For example, you may have encountered some feeling you’d never felt before, or you may have experienced a new or unusual combination of familiar emotions. Perhaps you felt emotions that you didn’t think would come up at this time. On the other hand, your emotions may have been quite close to what you expected to feel. Please describe any emotions, unusual or standard, positive or negative. The intensity of the emotion is not important.

4) What, in your opinion, made this experience unique?

5) Did you learn anything from this experience, and did your life or attitudes change in any way? If so, please describe what you learned and/or how you changed.

Instructions for the second and third narrative were similar, with differences only in the first paragraph of instructions.

Instructions for second narrative:

Have you ever felt that you were in love? Have you ever developed a really intense crush on somebody that you knew personally? If you have, try to select one such experience that was highly significant to you.
Instructions for the third narrative:

Perhaps you can imagine other situations or events in which new emotions would be required. Please describe one such event. This event can be something from your past, something you heard about, or something you make up. You needn’t indicate whether this experience ever happened to you. However, for simplicity’s sake, please answer the questions as though you were telling a story from your own past.
APPENDIX D

SAMPLE NARRATIVES FROM HIGH AND LOW CREATIVITY SUBJECTS

Note: Questions are abridged to save space. The actual questions given to the subjects are given in Appendix B. The questions are in all capitals, and subjects' responses are reported verbatim, complete with any spelling, grammar or punctuation errors.

Sample Love Narrative from a high creativity subject:

1. Describe the experience

A friend and I in March of '91, our second semester sophomore year, went to West Point to go to a military ball that a friend of hers had asked her to. She didn't want to go alone, so he got a friend of his to be my date and I went with her. Well, here I am, 19 years old, and never had a relationship with anyone. I had kissed one man, after our one and only date. So, I'm inexperienced, slightly in awe of the whole situation, and I fall head over heels for this cadet I had just met. We went to New York City for the day and he held my hand and put his arm around me. He did lots of sweet things and basically just treated me like gold. So I was starry-eyed and giggly. He was a tall, very attractive, West Point cadet, who charmed me and treated me well and I fell for him. It didn't work out, of course, he ended up being a total jerk who was only playing around.

2. What was happening in your life at this time?

As I said, I was a sophomore at U Mass, enjoying my semester. I had never had a relationship, never dated in high school, and had had one date in my freshman year (which didn't work out either). I honestly didn't think anyone would ever find me attractive. I had very low self-esteem in that aspect of my life. So I was a little insecure romantically. but ready to experience anything that happened.

3. What feelings did you experience?

I suppose I felt the typical, "Oh my God, I'm in love" sort of feelings. I was happy, smiling. My friend said I beamed! He made me feel wonderful! He made me feel beautiful and like I was the only one in his world!

The funny thing is, I also couldn't eat or sleep. If I smelled food I felt nauseous. And I woke up really early. I guess I was intensely nervous, which is understandable. I had never felt this way before.
4. WHAT MADE THIS EXPERIENCE UNIQUE?

Well, it was of course unique in my life because it was the first time it had happened. And the whole circumstances sort of made it out of the ordinary. I was set up with him just to go so my friend could have company. He was a West point cadet. You know it sounds like a movie!

5. WHAT DID YOU LEARN AND HOW DID YOU CHANGE?

Oh, I learned a great deal. I learned that my emotions are gonna go ahead and feel things no matter what my brain says and I learned how intense these feelings could be!

I also learned not to fall in love when you only spent 48 hours with someone and know practically nothing about them.

But the main thing I got out of this was that I was good enough. Men would find me attractive, and eventually I would have an open, honest and lasting relationship. Even though it ended immediately and badly, it gave me the confidence to know that I was okay, that I am worthy of love and of being treated well. It gave me hope that falling in love again would happen.
Sample Love Narrative from a low creativity subject:

1. **DESCRIBE THE EXPERIENCE**

I had a crush once on a girl in H.S. She was a very good friend of Mine. This put a damper on any sexual feelings expressed.

I felt more in love that year than I Ever had since, I find It hard now (4 yrs later) to feel love for any female, In that way. I still think of her frequently.

Nothing ever happened between us in H.S. This Summer past, we started talking frequently, and almost clicked. I messed up and didn't act on the feeling I know we had for each other, probably because I feared being hurt. She didn't act on them because she is too traditional.

2. **WHAT WAS HAPPENING IN YOUR LIFE AT THIS TIME?**

This spans a 3-4 yr time in H.S. Nothing significant last summer was the conclusion of my freshman yr of college. No significant life stresses except for the separation of My parents last summer.

3. **WHAT FEELINGS DID YOU EXPERIENCE?**

The one Emotion I can remember most clearly was the Anxiety of Indecission. I did not know what to do, buffer or express my feelings. I Eventually relieved the anxiety by using a defense mechanism and buffering my feelings.

4. **WHAT MADE THIS EXPERIENCE UNIQUE?**

the first girl (and maybe the last) that I really loved.

5. **WHAT DID YOU LEARN AND HOW DID YOU CHANGE?**

I got a bad attitude for women I general. I didn’t see it as my fault, though I do now. her best friend went to Amherst College, AND I seduced her just to satisfy my ”hatred" I saw it as getting back at the girl I wanted. After I seduced her friend I never called her again, and left her to feel cheap + used, I knew she hated it but this gave me pleasure. I've changed and realize I was a jerk, and wouldn't do that again.
Sample Open Narrative from a high creativity subject:

1. **DESCRIBE THE EXPERIENCE**

I have recently been able to admit that my mother is an alcoholic. She's not the stereotypical drunk, & she's always there for me & my sister. This semester has been pretty rough. I have fought feelings of hate, anger, & guilt because of my mom. I have been reading up on the subject & can better understand her & what's going on. I feel relief that it's not in my head. I thought I was going crazy. I felt pity because she can not help herself. I felt guilt because I couldn't be there for her when she needed it. I felt hurt because she's choosing alcohol over everything else in her life. I felt angry because she gets so despondent & helpless when she's drunk. She also does things that are abnormal to her character.

2. **WHAT WAS HAPPENING IN YOUR LIFE AT THIS TIME?**

My grades & just my life in general are not what they should be right now,. I feel so miserable sometimes because I don't know what to do. Once summer comes I'm going to straighten things out w/ her.

3. **WHAT FEELINGS DID YOU EXPERIENCE?**

I think I've described them.

4. **WHAT MADE THIS EXPERIENCE UNIQUE?**

I've always been the one to tell my mom that everything is okay - that they are wrong. "So what if you have a few beers?" Well, now I'm saying something is wrong - I want to make a change.

5. **WHAT DID YOU LEARN AND HOW DID YOU CHANGE?**

I've learned not to accept info. as fact. I think about it & judge for myself. I feel more self-sufficient & less dependent on my mom. I can detach myself & look at things as they are & not as if I have rose-tinted glasses on. I feel like my eyes are open now.
Sample Open Narrative from a low creativity subject:

1. **DESCRIBE THE EXPERIENCE**

One thing I fear that will happen to me, perhaps because I listen to such a liberalized campus, is that a friend will tell me he is a homosexual. If this happened I do not know what I would do.

One thing I would never talk to him, again. I would fear for my life, because if I had a gun I would kill him. I would never forgive him.

2. **WHAT WAS HAPPENING IN YOUR LIFE AT THIS TIME?**

Impossible to make up a scenario when this has never happened.

3. **WHAT FEELINGS DID YOU EXPERIENCE?**

I could only speculate feeling the Intense Emotion of Hatred + anger.

4. **WHAT MADE THIS EXPERIENCE UNIQUE?**

This experience would be unique because it has never happened to me.

5. **WHAT DID YOU LEARN AND HOW DID YOU CHANGE?**

My attitudes towards sexual deviance will never change. They are not normal, and should not reside in our society. They should be locked up in Mental Institutions, to stop spreading AIDS. My views must remain consistent, even if it is a friend.

"Consistency Has never been the Mark of Stupidity, for if He had Mearly been Stupid, he would have occasionally made an ERROR IN OUR FAVOR"
APPENDIX E

MUSIC FOR MOOD MANIPULATION

HAPPY CONDITION

Suite for Flute and Jazz Piano
Coppelia: The Mazurka
Always with Me, Always with You
Water Musick, Suite in F Major: Third Movement
Rodeo: Hoedown
Concierto de Aranjuez: First Movement
Brandenberg Concerto #6: Third Movement
Fried Bananas
Piano Concerto #23: Third Movement

C. Bolling 4:54
L. Delibes 3:43
J. Satriani 3:15
G. F. Handel 6:48
A. Copland 3:18
J. Rodrigo 5:56
J. S. Bach 3:55
D. Gordon 14:34
W. A. Mozart 7:45

Total time 54:08

NEUTRAL CONDITION

Discreet Music
Gravity Waves
Peace
Final Sunset
Well-Tempered Clavier #7 in E# Major

B. Eno 30:11
D. Hykes 8:14
G. Winston 6:12
B. Eno 4:10
J. S. Bach 4:56

Total time 53:53

SAD CONDITION

Adagio for Strings in G# minor
Stars Fell on Alabama
Symphony #1 in E minor: First Movement
Requiem Mass in D minor: First Movement
Concierto de Aranjuez: Second Movement
’Round Midnight

T. Albinoni 5:28
J. Coltrane 12:03
J. Sibelius 10:46
W. A. Mozart 5:42
J. Rodrigo 9:56
D. Gordon 13:13

Total time 57:08
APPENDIX F

MUSIC RATING SCALE

Please take a few moments to listen to the music that you are hearing. We would like you to rate the music that you are hearing RIGHT NOW. Don’t think about it too much, just relax, and mark the one that seems right to you. Please mark on the opscan sheet the number that most closely fits your opinion of the music.

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APPENDIX G
MOOD ADJECTIVE CHECKLIST

We are interested in how you are feeling RIGHT NOW. Please mark on the opscan sheet the number that most closely corresponds to how you feel RIGHT NOW. For each emotion, please use the following scale:

1=Not at all  2=A little  3=Somewhat  4=Quite a bit  5=Very definitely

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APPENDIX H
MOOD-CONGRUENT JUDGMENT SCALE

Please answer each of these questions on the opscan sheet in the appropriate place.

What is the probability that a 30-year-old will be involved in a happy, loving romance?

1. 0%-20%  2. 21%-40%  3. 41%-60%  4. 61%-80%  5. 81%-100%

How many thoughts, images and associations are brought to mind by the word: GENEROUS?

Very Few 2 3 4 A Great Deal 5

Which is the most typical example of a type of worker?

1. conscientious  2. lazy  3. honest

Which is the most typical example of a type of personality?

1. depressed  2. anxious  3. fulfilled

How many thoughts, images and associations are brought to mind by the word: WISDOM?

Very Few 2 3 4 A Great Deal 5

What is the probability of there being fewer good job opportunities in the near future than there are now?

1. 0%-20%  2. 21%-40%  3. 41%-60%  4. 61%-80%  5. 81%-100%
How many thoughts, images and associations are brought to mind by the word: PAIN?

Very Few                      A Great Deal  
1                         2            3             4             5

What is the probability that the average person will be a victim of crime this year?

1. 0%-20%  2. 21%-40%  3. 41%-60%  4. 61%-80%  5. 81%-100%

Which is the most typical example of an attitude?

1. optimistic  2. unfriendly  3. charitable

How many thoughts, images and associations are brought to mind by the word: DESTROY?

Very Few                      A Great Deal  
1                         2            3             4             5

What is the most typical example of a household possession?

1. musical instrument  2. gun  3. suitcase

What is the probability that the economy will improve in the next few years?

1. 0%-20%  2. 21%-40%  3. 41%-60%  4. 61%-80%  5. 81%-100%
APPENDIX I

STORY COMPLETION TASK

Please read the following. It is the beginning of a story. We would like to know how you think the story might end.

Lee and Chris are dorm mates at a large university. They can't stand one another. Chris' fondness for beer, and habit of bringing friends back to the room to hang out and talk late into the night bothers Lee intensely. And Chris is sick and tired of coming back to the room after classes to find Lee and Pat sitting in the room making eyes at each other and calling each other by silly pet names.

One day Chris comes back from a particularly nasty history test. Chris is tired, and really hopes the Lee is not in the room, because there are two beers in the fridge, and it's a real pain drinking with Lee giving the evil eye. Chris hears Lee's voice in the room - probably talking to Pat, as usual. Chris opens the door as Lee is hanging up the phone. Before Chris can say anything, Lee blurts out, "That was my father. My mother killed herself with an overdose of Valium last night."

Try to imagine what you would do if you were in Chris' position, and what you would do if you were in Lee's position. Looking at the situation from these two perspectives, what do you think would happen next? Finish up the story, trying to imagine how Chris and Lee would react, if they had the same type of emotional reactions that you have.

FOLLOW-UP QUESTIONS

If you were in Chris' position, what emotions would you experience? Please describe as many as possible, in as much detail as you like.

If you were in Lee's position, what emotions would you experience? Please describe as many as possible, in as much detail as you like.

If you were in Chris' position, would you experience any new or unusual emotions? Describe them.

If you were in Lee's position, would you experience any new or unusual emotions? Describe them.

If you were in Chris' position, would you be changed by this experience? How?

If you were in Lee's position, would you be changed by this experience? How?
If you were in Chris' position, how would your responses reflect the type of person you really are?

If you were in Lee's position, how would your responses reflect the type of person you really are?
APPENDIX J

SAMPLE ITEMS FROM THE BARRON-WELSH ART SCALE
APPENDIX K

EMOTIONAL/COGNITIVE CREATIVITY INVENTORY

Instructions

Rate each of the following statements as it applies to you in comparison with people in general. Be sure to answer all statements as honestly and accurately as possible. Mark your responses on the opscan sheet.

Mark "1" if you would respond much less than most people, or if the statement is much less true of you than of most people.

Mark "2" if you would respond somewhat less than most people, or if the statement is somewhat less true of you than of most people.

Mark "3" if you would respond about the same as most people, or if the statement is about the same for you as for most people, or if you cannot decide.

Mark "4" if you would respond somewhat more than most people, or if the statement is somewhat more true of you than of most people.

Mark "5" if you would respond much more than most people, or if the statement is much more true of you than of most people.

Read each item carefully and be sure to answer every item. There are no "right" or "wrong" answers. Simply describe yourself and state your opinions as accurately as possible. Your first intuitive response is usually the best. If you should change your mind, erase your first answer completely. Make sure that your answer is in the correctly numbered space.

I like art, music, dance, and paintings that arouse new and unusual emotional reactions. (Emotional)

When I have new thoughts or ideas, I search for the reasons for them. (Cognitive)

I respond well in situations that call for new or unusual ideas. (Cognitive)

I think about and try to understand my emotional reactions. (Emotional)

I can hold a variety of different ideas at the same time. (Cognitive)
I try to be honest about my emotional reactions, even when it causes me problems. (Emotional)

My thought processes are different and unique. (Cognitive)

I am good at expressing my ideas. (Cognitive)

I am sensitive to the emotional experiences of others. (Emotional)

My outward emotional reactions accurately reflect my inner feelings. (Emotional)

I can imagine myself being lonely, angry, and joyful, all at the same time. (Emotional)

I am not particularly interested in the intellectual aspects of my life. (Cognitive-Reversed)

I have had combinations of emotions that other people probably have never experienced. (Emotional)

I try to disguise and hide my emotions. (Emotional-Reversed)

"I have never looked at things this way before" describes many of my cognitive experiences. (Cognitive)

After an intensely intellectually challenging experience, I try to step back and examine my reactions objectively. (Cognitive)

I am able to experience a wide variety of different emotions. (Emotional)

The way I respond emotionally teaches me a great deal about myself. (Emotional)

I would have to be a poet or novelist to describe the kinds of ideas I sometimes have, they are so unique. (Cognitive)

I like to imagine situations that call for unusual, uncommon, or unconventional ideas. (Cognitive)

Before responding, I think about how my emotional reactions will affect other people. (Emotional)

I prefer movies and books that contain complex and unusual concepts. (Cognitive)
The way I experience and express my ideas helps me in my relationships with others. (Cognitive)

The range and diversity of my emotional reactions sometimes exceed my ability to describe how I feel. (Emotional)

My emotions are a major source of meaning in my life; without them, my life would lack significance. (Emotional)

I sometimes experience feelings and emotions that cannot be easily described in ordinary language. (Emotional)

When in situations that require thought and deliberation, I tend to respond in a unique manner. (Cognitive)

I often think about past emotional experiences to help me cope with current emotional problems. (Emotional)

I have thoughts that would be considered unusual or out of the ordinary. (Cognitive)

I pay attention to others' ideas and thought processes so that I can better understand my own. (Cognitive)

I can vary my emotions effectively to fit almost any situation. (Emotional)

When responding to an intellectual problem, I can be quite inventive and innovative. (Cognitive)
Written on the back was the following description:

The yellow is joy emanating.
The red center orange black is anger.
The bottom black prison with a little imprisoned pink dot is despair.

Sample collage from a high emotional creativity subject
Written on the back was the following description:

3 People -- One happy, one angry, one despairing

Sample collage from a low emotional creativity subject
APPENDIX M

SAMPLE STORIES FROM HIGH AND LOW CREATIVITY SUBJECTS

Note: To save space, the beginning of the story is not given, and the questions are abridged. See Appendix I for the beginning of the story and verbatim questions that were given to the subjects. The questions are in all capitals, and subjects’ responses are reported verbatim, complete with any spelling, grammar or punctuation errors.

Sample Story from a high creativity subject:

Chris would just stop. Thoughts of a history test fade from his mind as he is bombarded with feelings . . . about his MOM and how he would react. He suddenly feels ashamed at the way he has treated Lee - not giving him a full chance to get to know him. Chris feels pity and his heart goes out to Lee.

"I am truly sorry, Lee," Chris says quietly.

"I can't believe this! Mom, I love you! Why did you do this to yourself . . . to me?!!" Lee cries. Tears fill his eyes as he stands up and kicks his chair. He is angry, but so filled with sorrow. How could his mother do this? If she had problems, she could have dealt with it - Lee would have helped her . . . but not this way. It is like giving up hope, life . . . everything. Lee sits down on his bed with his face in his hands and sobs.

Chris moves toward him, sits on the bed next to him and just pats Lee's back.

EMOTIONS YOU'D HAVE IN CHRIS' POSITION

Sorrow for Lee
Thoughts of my own MOM, and if it happened to me, how sad I would feel.
Thankfulness that my mom is still alive
Guilt that I am thankful about my mom, and Lee’s is gone
Compassion
EMOTIONS YOU’D HAVE IN LEE’S POSITION

Extreme sadness
Questioning why mom did it
Anger that she left me alone
Anger that she ended her life
Emptiness, void in my heart
I’d just sit there and cry

NEW EMOTIONS IN CHRIS’ POSITION

Chris would experience compassion, which is not described in his personality - especially towards Lee.

NEW EMOTIONS IN LEE’S POSITION

Lee is described as passive, and now he’d be angry... real Mad that his mother is gone.

WOULD YOU BE CHANGED IN CHRIS’ POSITION

Yes. Be more thankful of my family + their health

WOULD YOU BE CHANGED IN LEE’S POSITION

Yes. Think more about the worth of people and things because nothing last forever.

HOW DO THESE RESPONSES REFLECT CHRIS’ TRUE SELF

Compassion --> say you’re sorry
Sadness
Guilt

HOW DO THESE RESPONSES REFLECT LEE’S TRUE SELF

Anger --> kick a chair
Saddness - cry - a lot!
True Emptiness
Depression
Sample Story from a low creativity subject:

Chris would say "That is a tragedy. I am so sorry. Is there anything I can do to help?" He says this because Chris knows that losing a loved one is much more important than failing a history exam.

Lee says "Thanks, but this is something that I will have to deal with on my own."

Chris then leaves Lee alone in the room. Lee goes onto his bed. Lies down and starts to cry.

EMOTIONS YOU’D HAVE IN CHRIS’ POSITION

sadness - why did I get a party pooper for a roommate

EMOTIONS YOU’D HAVE IN LEE’S POSITION

anger - Why did I get a dumb, stupid partier for a roommate

NEW EMOTIONS IN CHRIS’ POSITION

I would feel selfishness because you are feeling bad about failing an exam when someone you know experienced losing a loved one

NEW EMOTIONS IN LEE’S POSITION

I would feel really bad because someone I came to for advice could not ask me for help

WOULD YOU BE CHANGED IN CHRIS’ POSITION

No, because probably get a new roommate next semester and forget about

WOULD YOU BE CHANGED IN LEE’S POSITION

empty heart Yes, he will never see nor hear his mother

HOW DO THESE RESPONSES REFLECT CHRIS’ TRUE SELF

Chris is a hard partier with a heart

HOW DO THESE RESPONSES REFLECT LEE’S TRUE SELF

Lee is a nice person who does not have good luck in life
REFERENCES


