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MOOD AND DIVERGENT THINKING:
ONE ROLE OF AFFECT IN CREATIVITY

by

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Submitted in partial fulfillment of the requirements
for the Degree of Doctor of Philosophy

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MOOD AND DIVERGENT THINKING:
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Abstract
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The present study investigated the effect of mood induction on divergent thinking. Children’s expression of affect and cognitive integration of affect, measured in their fantasy play, were examined as moderator variables. Ninety-six second and third grade children were administered a divergent thinking test, a mood induction procedure, a second divergent thinking test, the WISC-R Vocabulary and Block Design subtests, and the Affect In Play Scale. The main hypotheses of this study, that induced happy, sad, and angry moods would affect the divergent thinking of children, specifically, with positive mood having a facilitative effect, were not supported by the main analyses. However, residualized change score analyses that maximized the reliability of the mood induction and simplified the mood conditions to a positive versus negative contrast did obtain significant results. Overall, the negative
mood inductions resulted in an increase of divergent thinking flexibility and originality whereas the positive mood induction resulted in a decrease of divergent thinking flexibility and originality. A series of exploratory, simple change score analyses was generated in order to explore the data further. The results indicate a pattern of significant differences such that the post-test scores were greater than the pre-test scores for divergent thinking flexibility and originality (not fluency) for all three mood conditions, supporting the main hypotheses of the study. Secondary hypotheses were not supported in that children’s ability to express and integrate affect in their play did not moderate the effects for positive and negative affect. Additional exploratory analyses found quality of children’s play to be significantly, positively related to original divergent thinking. The results support further investigation of affective processes and creativity.
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Introduction

Affect states (or mood) have been hypothesized to be related to such diverse areas as creativity, memory, learning, problem solving, children's play, and psychopathology. The effects of experimentally induced affect on creative thinking have been explored in the adult literature mainly with college students. The picture for children has been left relatively unexplored however. Only one study looking at the effects of induced mood on creative thinking of preschool age children appears to have been done (Isen, personal communication). No experiments examining the effects of mood on the creative thinking of young children appear in the literature. The present study investigated the effects of positive and negative affective states on the divergent thinking of 2nd and 3rd grade children.

Creativity

Agreement on what is meant by creativity has been elusive. However, most definitions contain common elements. Creativity historically has been defined as a stable set of traits (Guilford, 1950) and more recently as simply processes (Milgram, 1990) that result in some sort of product that can be called creative. For a product to be considered creative, most researchers agree, it must be both original or novel, and
appropriate, not merely strange (e.g., Jackson and Messick, 1967; Brown, 1989; Milgram, 1990).

Disagreement over the definition of creativity has led to measuring creativity through many different means. Hocevar and Bachelor (1989) classify over 100 examples of creativity measurements, illustrating the multitude of operational definitions that have been used. In an attempt to make these many measures more understandable, Hocevar and Bachelor (1989) categorize the measures into eight categories. Their first category is tests of divergent thinking, the most widely used approach to studying creativity (Hocevar and Bachelor, 1989). Other categories of creativity measures described by Hocevar and Bachelor (1989) include attitude and interest inventories, personality inventories, biographical inventories, ratings by teachers, peers, and supervisors, judgments of the creativity of products produced, eminence of the creative person, and self-reported creative activities and achievements.

One of the conceptual disagreements regarding the study of creativity focuses on how novel and useful the creative product must be in order to be labeled creative. From this controversy follows logically the controversy of how unusual the creative person is. Is
the truly creative individual a rarity? Or instead, is creativity distributed normally in the population with some individuals possessing little and others possessing a great deal. Some researchers believe true creativity to be rare and qualitatively different from the type of original thought one might observe in the general population (e.g., Gruber, 1989; Nicholls, 1972). According to this view the great artists, scientists, musicians, and other creative individuals are qualitatively different from other people and any attempt to study creativity as a trait possessed to varying degrees by most people will be doomed.

This view encourages a naturalistic approach to the study of creativity, avoiding broad theory or specific measures and instead observing the individuals who produce what can be communally agreed to as being creative products. Such agreement can, in fact, be reached. When groups of judges have been asked to rate creativity of products within their own fields of expertise, high interrater reliabilities have been obtained (e.g., MacKinnon, 1962; Getzels and Csikszentmihalyi, 1976; Amabile, 1983a, 1983b; Sternberg, 1985). Gruber (1989) argues strongly for the case study method to examine creativity. He argues that truly creative individuals are qualitatively different
from others and that trying to find sets of traits to describe them will not only be unsuccessful, but will trivialize and oversimplify the complexity of the creative process.

The opposite approach to the study of creativity argues that it is a trait, or comprises a set of cognitive abilities possessed in varying degrees by all individuals. This approach has its roots in the earliest creativity research, beginning with Guilford’s (1950) APA presidential address which is generally viewed as the basis for current creativity research (Brown, 1989). Guilford’s (1956) structure-of-intellect model proposed a number of abilities as making up intelligence including those cognitive abilities, such as divergent thinking, that should be associated with creativity. According to this model, just as intelligence is normally distributed throughout the population, so should creativity be. This view continues to the present day. For example, in describing the conclusions of a recent conference on creativity, Albert and Runco (1990) describe a consensus among participants that not only do all individuals possess creative potential, but it is in the best interest of both individual and societal well-being to promote the development of this potential.
Although it is undoubtedly the case that examining specific traits of creativity will not adequately describe any creative individual, examining specific traits or cognitive components of creativity has the advantage of being able to be studied under controlled conditions in a laboratory setting. The fullest picture of creativity, however, will most likely need to come from the combination of all sources (Hocevar and Bachelor, 1989).

**Divergent Thinking**

Divergent thinking is a type of thought that generates multiple possible solutions to a problem. Divergent thought stands in contrast with convergent thought, which generates a single solution to a problem on the basis of the facts and is most useful for solving the type of problems in which a single solution may be obtained from the facts, such as mathematical problems. Divergent thought, however, is most useful for solving problems in which multiple, novel solutions are required (Guilford, 1959). Anastasi (1988) describes divergent thinking as being "less restricted by given facts" (p. 404), thus allowing for more creative problem solving.

Divergent thinking has been associated with creativity research since its inception. Convergent and divergent thinking were initially distinguished in
Guilford's (1959; 1967) structure of intellect model and reflect the independence of intelligence tests and creativity tests that he proposed (Guilford, 1950). Kogan (1983) asserts that the most robust finding in creativity research may, in fact, be the statistical separation of divergent and convergent thinking measures. This statistical separation has been consistently obtained for the Wallach and Kogan divergent thinking tasks (1965) over an age range of children from nursery school to college students (Kogan, 1971; 1973).

A number of scoring categories for divergent thinking tests have been developed. Most commonly measured have been ideational fluency (number of responses generated to a task item), spontaneous flexibility (number of different categories of response), uniqueness (number of responses produced by a child that no other child in the sample produces), and quality of responses (reflecting both uniqueness and appropriateness) (Kogan, 1983).

Spontaneous flexibility, uniqueness, and quality tend to be less reliable and more difficult and time-consuming to score than is ideational fluency. Given these difficulties, Kogan (1983) questions whether any valuable information would be lost if only ideational
fluency, the total number of different responses generated, were used. After reviewing the relevant literature Kogan (1983) concludes that the intercorrelations among all types of scoring of divergent thinking tests are high enough to utilize only "the most reliable and economical index ..., ideational fluency" (p. 637). More recently Runco (1991) has found that summarizing several of the scores yields the best predictive criteria.

Tests that measure divergent thinking to measure creativity have received quite a bit of criticism however (e.g., Gruber, 1989; Horn & Knapp, 1973; Nicholls, 1972; Weisberg, 1986). Milgram (1990) attributes the controversy to predictor/criterion misunderstanding in the field of creativity. She argues that ideational fluency should not be thought of as a criterion of creative behavior but rather as a predictor of it. Milgram (1990) further argues that ideational fluency, or divergent thinking, should be seen as one of a number of cognitive and other abilities that have been found to be involved in creativity (e.g., Barron & Harrington, 1981; Kogan, 1983).

Affect

Guilford’s structure-of-intellect model, with its emphasis on divergent thinking abilities, focuses on the
cognitive components of creativity. A number of other models of creativity also emphasize cognitive processes (e.g., Sternberg, 1988). There has been increasing recognition, however, of the influence of affect on cognitive processes (e.g., Isen, 1987; Masters, Felleman, & Barden, 1981). If affect is recognized to influence a number of cognitive processes, its influence in the area of divergent thinking, and by extension the area of creativity, should also logically follow. The interaction of cognitive and affective processes is strongly emphasized in Russ’ (1993) model of creativity.

Affect has been conceptualized as emotions, moods, (Isen, 1987) and even as simple arousal (Anderson, 1983). Izard (1977) describes affect as a broad range of events that include both emotions and drives. Tomkins (1962, 1963) also describes affect through a rather broad-based model. He defines the positive affects (1962) as interest-excitement, enjoyment-joy, and surprise-startle. Tomkins defines the negative affects (1963) as distress-anguish, fear-terror, shame-humiliation, contempt-disgust, and anger-rage. Tellegen (1989) and Russ (1993) both distinguish affect and emotion by describing emotion as a subset of affect. Affect is described as encompassing all feelings and emotions that are distinct from cognitions while
emotions are described as merely states of aroused feelings.

The cognitive-behavioral therapy literature also discusses the interaction of affect and cognition. The "affect" that is discussed in the cognitive-behavioral literature, however, appears more akin to the "emotion" or "mood" that is discussed by more psychodynamically oriented writers. For example, Beck, Rush, Shaw, & Emery (1979) describe the depressed person’s tendency to interpret events in a negative manner as causing that person to react in a negative manner consistent with his or her negative interpretation. That is, if one expects to be rejected, one "will react with the same negative affect (for example, sadness, anger) that occurs with actual rejection" (p. 11). It appears that affect is conceptually indistinct from mood in the cognitive-behavioral literature.

In contrast, psychoanalytic conceptions of affect involve not only the mood involved, but also intrapsychic processes. Brenner (1982), summarizing the psychoanalytic concept of affect, states, "ideas and pleasure-unpleasure sensations together constitute an affect" (p. 53). The sensations to which Brenner refers are the same as sensations associated with drive derivatives. That is, they are associated with the id.
The ideas to which Brenner refers are dependent on ego and superego development. Thus affect is conceptualized as a complex phenomenon, involving sensations transformed from their raw, drive state by ego and superego functioning.

The classic psychoanalytic, or more recent psychodynamic, conception of affect also includes primary process thought. Recognizing the connection between primary process thought and affect as conceptualized from a psychoanalytic or psychodynamic standpoint is important because psychoanalytic theory describes a relationship between access to primary process thought and creativity.

Primary process thought was described by Freud (1915/1958) as early, primitive, drive-laden thought that is neither logical nor reality-bound. It contains aggressive and libidinal material as well as thoughts related to that material (Holt, 1977). Russ (1993) describes primary process thought as a type of thought most dominant in children’s earliest points of development. As children develop, secondary process thought becomes more dominant. The primary process thought does not disappear but becomes integrated into the secondary process thought, to be expressed in a
manner that is controlled and approved by society (Russ, 1993).

The relationship between primary process thought and affect has been described in several ways. As Russ (1993) has reviewed, primary process thought has been described as having an affective component (Rapaport, 1951; Zimiles, 1981). Primary process thought has also been described as a means to cope with emotional material (Martindale, 1981; Pine & Holt, 1960). Russ (1987) has hypothesized primary process thought to reflect current intense emotional material as well as "affective residue" in cognition left over from earlier developmental stages during which the child experienced intense feeling states.

Access to primary process thought in a controlled fashion was described by Kris (1952) in his classic concept of "regression in the service of the ego". The "regression" to which Kris refers is a reverting to the earlier, more primitive form of thought described by primary process thinking. The regression is "in the service of the ego" because it is controlled. That is, reverting to primary process thought in an uncontrolled manner would be indicative of rather severe psychopathology while utilizing primary process thought in a controlled manner would provide access to a type of
thinking that should facilitate creative thought (Russ, 1993).

A number of theorists agree that the important aspect for creativity is access to primary process thought, not regression (Arieti, 1976; Bush, 1969; Giovacchini, 1960; Martindale, 1989; Suler, 1980). Access to primary process thought should facilitate creativity because access to primary process thought should facilitate the type of thought processes, such as free associations and broad scanning, important for divergent thinking (Russ, 1993).

A number of other researchers have also examined the links between affect and cognition. For example, Lazarus (1991) describes emotion and cognition as not only interrelated but inseparable. His view that emotion must always involve cognition is quite congruent with the cognitive-behavioral conception of affect. Zajonc (1980), in contrast, describes affect and cognition as independent processes that interact with each other. That is, either process may occur alone or both processes may interact.

**Mood Induction**

One of the ways the links between mood and creativity have been studied has been through mood induction paradigms. Isen, Daubman, & Nowicki (1987)
examined the effects of induced positive and negative moods on creative problem solving. In a series of four studies, they induced positive and negative moods with college students and observed the effects for creative problem solving. Positive mood was induced either through viewing a short comedy film or by giving small gifts. Negative mood was induced via viewing a short film. Creativity was measured by the Duncker (1945) candle task and by a short form they developed of the Mednick, et al. (1964) Remote Associates Test. In Isen, Daubman, and Nowicki’s (1987) series of studies, subjects who underwent the positive mood induction solved the candle task more often, and obtained more correct responses on the Remote Associates Test, than did subjects in control (no mood induction) or in exercise (no mood induction but activity) conditions. No significant effects were obtained for subjects who underwent the negative mood induction.

Greene and Noice (1988) examined the effect of induced positive mood on creativity and problem solving with eighth grade students. They induced positive moods via giving gifts and compliments and measured creativity by presenting the adolescents with category names and asking them to generate as many exemplars as possible to those categories. Problem solving was measured via
Duncker’s (1945) candle task. Greene and Noice (1988) found that subjects in the positive affect condition generated more exemplars as well as more unusual exemplars for the categories and solved the candle task more often than did subjects who were in a neutral (no induced affect) condition.

Jausovec (1989) compared the effects of induced positive, negative, and neutral affect on creativity with college students. Creativity was assessed as the ability to utilize analogical reasoning, transferring base information to solve ill-defined and well-defined problems. Affect was induced by films. This research concluded that positive affect increased analogical problem-solving with an ill-defined problem but impaired it with a well-defined problem.

Tighe (1992) compared the effects of induced positive, negative, and neutral (control) moods on creativity as measured by three brief stories that each subject wrote. This research found that individuals in positive mood conditions wrote stories that were rated as less creative than those in either the negative or neutral conditions. In contrast to the results obtained by Isen, et al (1987), by Greene and Noice (1988), and by Jausovec (1989) who all found positive mood to be associated with increased creativity, Tighe (1992) found
positive mood to be associated with decreased creativity.

The Isen, Daubman, & Nowicki (1987) studies were designed as a test of Bower's (1981) associative network theory. Bower (1981) developed the associative network theory to describe and explain the interaction of mood and memory. His research observed the effects of induced happy and sad moods on the memory of adults. Bower (1981) found that subjects in whom positive mood was induced remembered more positive life experiences and childhood memories while subjects in whom negative mood was induced remembered more negative life experiences and childhood memories. His associative network theory describes emotions as having special units in memory. The theory further maintains that when an emotional unit is stimulated, spreading activation makes other material encoded in that memory unit more accessible for attention, learning, and other cognitive processes. This theory has rather direct implications for divergent thinking in its assertion that emotional arousal should make more, mood congruent, information available for cognitive processing.

In their test of the associative network theory, Isen, Daubman, & Nowicki (1987) concluded that positive affect facilitates creative problem solving because
"good feelings increase the tendency to combine material in new ways and to see relatedness between divergent stimuli" (p. 1130). They interpreted the results they obtained for positive mood as support for Bower's (1981) associative network theory.

The results Isen, Daubman, and Nowicki (1987) obtained for the negative affect induction group were no different from those obtained for the control group. That is, negative affect neither facilitated nor inhibited creative problem solving. The associative network theory (Bower, 1981) predicts that negative affect should facilitate divergent thinking. Although Isen, Daubman, and Nowicki (1987) failed to support the associative network theory for negative affect, they did not view their results as evidence against the theory. Instead, they attributed the results they obtained for negative affect as due to methodological problems.

The stimulus Isen, Daubman, & Nowicki (1987) used to induce the negative affect was an extremely intense one. They showed five minutes of the film *Night and Fog*, a documentary film depicting Nazi concentration camps. Given the intensity and the content of this film, the affect it induced may have included not only sadness but also horror, anger, fear, shame, and anxiety. The negative affect may have made been
difficult for some subjects to maintain; in fact, they may have felt the neutralizing affect of relief on beginning the problem solving task. Thus, the specificity of the affect induced as well as whether the affect was maintained into the problem solving portion of the experiment may be questioned.

Although Bower's (1981) associative network theory would predict that sad affect should facilitate creative thinking, there is some evidence that sad affect might have an inhibitory effect on creative thinking. Negative affect has been observed to have an inhibitory influence on preschool children's speed and accuracy in learning a discrimination task (Masters, Barden, & Ford, 1979). This inhibition may be due to distraction (Masters, Barden, & Ford, 1979), to a lack of incentive for mastery associated with the negative affect (Masters & Santrock, 1976), or to another factor that has not yet been identified. Thus, there is some empirical evidence to predict that negative affect may have an inhibitory effect on creative thinking and problem solving, although the theoretical basis for this prediction is not yet clear.

Theorizing regarding the effects of negative affect on various processes cannot be based solely on the observed effects of positive affect, but instead should
be investigated independently. Although positive and negative affect may initially be thought of as opposite ends of the same process, there is no evidence to support this view. As Isen (1987) notes, "the finding that positive affect produces a certain effect does not necessarily imply that negative affect will give rise to its opposite, as is often assumed" (p. 205). She goes on to argue that positive and negative affect may in fact be independent processes rather than bipolar ends of the same continuum (1987). The implication of this observation is clearly that positive and negative affect should be investigated separately.

**Mood Induction and Children**

Induced affective states in 2nd and 3rd grade children have been associated with patterns of self-gratification (Moore, Underwood, & Rosenhan, 1973; Rosenhan, Underwood, & Moore, 1974), altruism (Harris & Siebel, 1975; Moore, et al., 1973; Rosenhan, et al. 1974; Underwood, Froming, & Moore, 1977), and aggression (Harris & Siebel, 1975). In their (1981) review, Masters, Fellemann, and Barden note that an emerging body of literature indicate that affective states exert a powerful influence on cognitive mechanisms as well. Affective states in children have been found to be associated with expectations regarding future events
(Masters & Furman, 1976), learning (Masters, Barden, & Ford, 1979), and memory (Barden, Garber, Duncan, & Masters, 1981).

In addition, children’s mood has been demonstrated to influence their school performance and cognitive development. For example, an intervention in an elementary school which focused on inducing positive, warm affect between children and teachers resulted in significant academic gains and fewer aggressive incidents by students (Currie, 1988).

The relationship between experimentally induced affect and divergent thinking in children does not appear to have received research attention. Indeed, there appear to be no published studies that address the relationship between induced mood and creativity, whether measured by divergent thinking or some other means. Isen (personal communication) has studied induced affect and divergent thinking in preschool age children but has not yet published these results.

Although previous research investigating the effects of induced mood on cognitive functioning has tended to overlook the age range encompassing middle childhood, there is some reason to expect that children’s moods will influence their divergent thinking. Further, the mood induction procedure has
been demonstrated to be a valid method to study the effects of depressed mood in children in a controlled laboratory setting (Silverman, 1986).

**Affect and Children’s Play**

Although the induced affect paradigm has not yet been utilized to investigate the relationship between children’s moods and creativity, the relationship between children’s play and creativity has been explored in some detail. Further, a small subset of the literature that examines children’s play and creativity addresses the affective components of children’s play.

Positive affect in children’s play has been indirectly explored by those researchers who have investigated play through the construct of playfulness (Lieberman, 1977). The measure of play Lieberman (1977) developed is actually a measure of playfulness and joy in play. The measure is a teacher report questionnaire that rates children on playfulness factors defined as physical spontaneity, social spontaneity, cognitive spontaneity, manifest joy, and sense of humor. Factors of spontaneity, manifest joy, and sense of humor are clearly related to the children’s ability to take pleasure from their experience of play. That is, perhaps children who are rated with high playfulness scores are those children for whom play is a naturally
occurring situation in which positive affect is induced (Russ, 1993).

The relationship between playfulness and divergent thinking has been explored by Lieberman (1965) who found a positive relationship between playfulness and divergent thinking for kindergarten children. Singer and Rummo (1973) also examined this relationship and found positive, significant correlations for kindergarten boys. Barnett and Kleiber (1982) criticized this previous research for not controlling for the effects of the children's intelligence. They examined the relationship between play and divergent thinking for preschool children. When intelligence was controlled, significant, positive correlations were obtained for girls but not for boys.

The Barnett and Kleiber (1982) study is especially interesting due to its careful attention to controlling for both intelligence and gender. If, as has been proposed, the playfulness measure (Lieberman, 1977) can be thought of as a naturally occurring situation in which positive affect is induced for those children who are able to take pleasure from the experience of play, then the Barnett and Kleiber (1982) study can be interpreted in a new light. That is, perhaps what Barnett and Kleiber (1982) have observed is a naturally
occurring situation in which positive affect is induced and is then found to be related to preschool girls' divergent thinking abilities. Perhaps a natural induction of positive affect, in this case preschool girls' pleasure in the experience of play, has been demonstrated to be related to divergent thinking abilities.

If playfulness may be thought of as a natural induction of positive affect for children who are able to take pleasure from the experience of play then, logically, one might expect a negative affect induction to occur for children for whom play is an unpleasant or frightening experience. In one relevant study, Singer and Singer (1981) found that the preschoolers who showed significantly more themes of anger and power were the preschoolers who they had rated as high imagination players compared to low imagination players. That is, the children who were displaying more negative affective experience were the more imaginative, creative players.

As has already been discussed, there is no logical reason to assume that positive and negative affective states should exert opposing influences on various dependent measures. Therefore, the effect of positive and negative affective states on various measures of creativity may be the same or they may be different.
That is, the Singer and Singer (1981) and the Lieberman (1977) results do not contradict one another. For example, one possible consistent explanation would be that any affective arousal, whether positive or negative, facilitates creativity. This is an especially interesting explanation not only because it supports Bower’s (1981) associative network theory but also because affective arousal has been demonstrated to be qualitatively different from simple physical arousal (Isen, Daubman, and Nowicki, 1987). That is, if any affect facilitates creativity it is not doing so because the individual is more alert. Rather, it is something about the experiencing of affect per se that is facilitating creative thought.

Preschool children’s play has been observed to facilitate their divergent thinking (Dansky & Silverman, 1973). Further, make-believe play in particular has been noted as the mediating factor in the relationship between play and divergent thinking. (Dansky, 1980). Free play facilitated divergent thinking only for the children who were better players, that is, those who were able to engage in more make-believe play (Dansky, 1980). The theoretical explanations for this observed facilitation of divergent thinking through make-believe play have mainly focused on children’s cognitive
abilities (Dansky, 1980; Saltz, Dixon, & Johnson, 1977; Sherrod & Singer, 1979; Sutton-Smith, 1966). Russ (1993), however, proposes that affect may act as a moderator variable in the relationship between play and divergent thinking.

Affect in children’s play as well as the relationship between affect and creativity in children has been explored in a series of studies by Russ. Looking first at the expression of primary process material, Russ (1982) found that primary process integration of third grade boys was positively related to their ability to shift problem-solving strategies. Access to and integration of primary process thinking of fifth grade boys was also positively related to their divergent thinking abilities (Russ, 1988). In both of these studies (Russ, 1982; 1988) results were nonsignificant for girls and girls expressed significantly less primary process material than did boys.

Russ and Grossman-McKee (1990) examined the expression of affect in play directly with the Affect in Play Scale. Affective expression in the play of first and second grade boys and girls was found to be significantly, positively related to their divergent thinking. These results remained significant after the
effects of the children's intelligence were statistically controlled. Further, the amount of primary process material the children expressed in the Rorschach was found to be significantly, positively related to affective expression in play. The relationship between affect in play and divergent thinking just described was later replicated by Russ and Peterson (1990).

**Gender Differences**

In the creativity literature, gender differences tend not to appear in the specific measures of creativity. That is, whether creativity is measured through divergent thinking, problem solving tasks, or another means, men and women (and boys and girls) tend to do equally well (Kogan, 1983). However, when attempts are made to correlate various independent variables with creativity, then gender differences do appear (Russ, 1993). It appears that males and females do not differ in their amount of creativity, but rather in the processes that predict or relate to creativity.

The pattern of these sex differences, however, is unclear. Barnett and Kleiber (1982) correlated playfulness and divergent thinking, while controlling for intelligence. They obtained correlations between the playfulness factors and divergent thinking for girls
with a mean strength of .51 (p<.005), while for boys the mean correlation was .13 (nonsignificant).

In contrast, Russ (1982, 1988) assessed the relationship between access to primary process material and creativity. In one study (Russ, 1982) positive results were found for third grade boys but mixed results were obtained for girls. For boys access to primary process material was positively related to ability to solve the creativity problem in two separate samples. For girls, positive results were observed in one sample but no relationship was observed in the second sample. In the second study (Russ, 1988) positive results were obtained for 5th grade boys while no significant correlations were obtained for the girls.

Further research is necessary to understand the gender differences that have been observed and the processes relating to creativity that these differences reflect. One hypothesis that has been described is that the observed gender difference may be related to the socialization process girls tend to receive in which expression of negative affect is discouraged (Russ, 1993). Support for this hypothesis is found in a study comparing highly creative college women with a comparison group of college women (Helsen, 1990). One of the differences between the highly creative women and
the comparison group of women was that the creative
women did not inhibit negative affect (Helsen, 1990).

**General Hypotheses**

The major hypotheses of this study were that
induced happy, sad, and angry moods would affect the
divergent thinking of children. More specifically, it
was predicted that positive affect would facilitate
divergent thinking in children. That is, positive mood
induction should predict increased divergent thinking
scores.

Although effects on divergent thinking were
predicted for the negative mood induction groups, the
direction of these effects was not clear. Little
previous research exists on which to predict a direction
of effect. Two previous studies directly examining for
the effects of sad mood on creativity found no effects
(Isen, Daubman, & Nowicki, 1987; Tighe, 1992). Other
research examining for effects of induced sad mood on
cognitive functioning have found inhibitory effects.
Negative affect has been observed to have an inhibitory
influence on preschool children’s speed and accuracy in
learning a discrimination task (Masters, Barden, and
Ford, 1979). In contrast, Bower’s (1981) associational
network theory predicts that induced sad mood should
have a facilitative effect on divergent thinking. Also,
psychoanalytic theory, as well as the play and creativity research literature, would both support a prediction that negative affect should facilitate divergent thinking.

The secondary hypotheses of this study were that children’s ability to express and integrate affect in their play would moderate the effects for positive and negative affect. The effects of induced happy, sad, and angry moods on children’s divergent thinking should be moderated by the children’s ability to express affect in play, the overall quality of their play, and their comfort with unstructured play.
Method

The effect of happy, sad, and angry moods on divergent thinking was examined in 2nd and 3rd grade children. The children’s expression of affect and cognitive integration of affect, as measured in their fantasy play, were examined as moderator variables in the effects of induced mood on children’s divergent thinking.

Participants

Data were collected from 96 second and third grade children (average age was 8.7 years; minimum age = 7.75, maximum age = 10.13), recruited from the public school systems of two middle class, racially integrated suburbs. Data for 20 children were collected in a suburb of a midsize, midwestern city; data for the remaining 76 children were collected in a suburb of a midsize, western city. Analyses of descriptive data failed to indicate any statistically significant differences between children from the two cities on any of the test measures (see Table 1). Parent permission forms for both school districts may be found in Appendix A.

Although the schools in which children were recruited to participate in the study were all racially
diverse, the children who did participate in the study were predominantly Caucasian. Out of the 96 children in the study, 77 (80.2%) were Caucasian, 12 (12.5%) were African American, 6 (6.3%) were Hispanic, and 1 (1%) was Native American. Analyses of descriptive data failed to reveal any statistically significant ethnic differences on the divergent thinking or the intelligence tests. On the Affect in Play Scale, one statistically significant difference between Caucasian and African American children did emerge. The mean frequency of affect score on the Affect in Play Scale is higher for Caucasian than for African American children (see Table 2).

**Procedure**

Each child was tested individually. The testing session began with the administration of the first form of the divergent thinking measure (Alternate Form A) to assess baseline divergent thinking abilities in a neutral mood state. One of the three mood induction procedures, randomly assigned to each child, was then administered. Immediately following the mood induction procedure, all children were administered the second, equivalent form (Alternate Form B), divergent thinking test. Intelligence was measured so as to statistically control for its effect. Finally, children were engaged
in a short period of fantasy play. The entire testing session lasted approximately 40 minutes per child.

**Mood Induction**

After the first form of the divergent thinking test was administered, the mood induction procedure began. Each child was randomly assigned to a happy, sad, or angry mood induction condition. The order of this random assignment of mood conditions was determined by a Latin square.

Induction of mood was validated by children’s self-ratings after the second divergent thinking test had been administered. Children were shown line drawings of faces depicting happy, sad, neutral, and angry mood. They were asked to "point to the face that shows how you feel". The line drawings of faces that were used for this study may be found in Appendix B.

Self-ratings of moods have been used in research with both adults and children. Tape recordings of children’s voices have been used in previous research as an alternate validity check. However, this method itself has questionable validity due to issues of self-presentation and perceived social correctness of expression of affect (Silverman, 1988). Videotaped facial expressions have also been rated by independent, blind raters as an alternate validity check. However,
this method has the disadvantage of being cumbersome and
time-consuming.

The mood induction procedure used was similar to
that developed by Moore, Underwood, and Rosenhan (1973).

Happy mood. For the happy mood induction the
experimenter said to the child:

Now I want you to tell me something that really
makes you happy, something that makes you feel
good. (The experimenter pauses while the child
responds.) That’s right. _____ is really fun!
You really feel good when ____. What else makes
you happy? That’s right. That’s a lot of fun too.
I want you to practice thinking about things like
that. You pick one of those things we mentioned
and think about what happens and how you feel.
Let’s try it. You think about how happy you feel
when ____.

The experimenter then waited 10 seconds and asked:

Did you think about it real hard? Good, that’s the
way I want you to think about it. Just think about
how happy you feel. OK, think about it now.
The experimenter continued to attend to the child,
maintaining intermittent eye contact for the next
20 seconds.

Sad mood. Procedures for sad mood are identical to
those described for positive mood except that children
were asked to think of events that have made them sad
("Now I want you to tell me something that really makes
you sad, something that makes you feel bad"). However,
while no limits were set on how happy a child could
become in the positive mood condition, limits were set
in the negative mood condition. Moore, Underwood, and
Rosenhan (1973) reported that occasionally a child
recalled quite upsetting events, for example "when my father died" and indeed, in this research also, an occasional child reported such an extreme event. In order to minimize the possible negative consequences of the mood induction, the experimenter responded gently to the upsetting memory, and then asked the child to think of something else. In this research, as in that of Moore, Underwood, and Rosenhan (1973), the child always thought of a less distressing experience such as "when I wasn’t invited to a birthday party!" The child was then asked to focus on that sad, but less distressing, experience.

**Angry mood.** Procedures for angry mood were identical to those described for happy and sad moods except that children were asked to think of events that have made them angry ("Now I want you to tell me something that really makes you angry, something that makes you feel mad"). As in the sad mood condition, appropriate limits were set for how angry a child could become. The experimenter used clinical sensitivity to judge whether a memory might have been quite upsetting for the child and, if this were the case, gently responded and redirected the child to a less distressing memory.
Measures

Divergent thinking. To measure divergent thinking for the present study, two alternate forms of the Wallach and Kogan (1965) adaptation of Guilford’s Alternate Uses test with additional administration rules developed by Russ and Peterson (1990) were developed. Each form consists of a total of six items: four items from the original test and two items that have been added for this study.

The two forms of the divergent thinking measure were developed so that each child could serve as his or her own control to measure change in divergent thinking. Since previous research (Isen, Daubman, & Nowicki, 1987) had already established no difference between the effects of neutral affect induction and simple arousal, no additional control group was judged to be necessary.

The two forms of the test were developed using pilot data from 51 second grade children. Spontaneous flexibility scores on each of the eight items in the original test were intercorrelated. When each pair of items with the highest correlations ($p < .001$) were then separated two sets of four items emerged. The two sets of items are knife, tire, chair, key (Form A) and newspaper, button, shoe, cork (Form B). Pearson product moment correlations were then determined for spontaneous
flexibility scores for Form A with Form B ($r = .76, p < .001$), Form A with the total scale ($r = .93, p < .001$), and Form B with the total scale ($r = .94, p < .001$). Correlations obtained were all statistically significant ($p < .001$) and were judged to be high enough to use the two forms as equivalent but alternate forms of the divergent thinking measure. In order to improve reliability on the divergent thinking measures, two items were added to each form for a total of six items each.

In this test children are asked to name as many different ways as they can think of to use common objects. The test instructions are:

Now, I am going to name an object, any kind of object, like a light bulb, and it will be your job to tell me all the different ways that the object could be used. Any object can be used in a lot of different ways. For example, think about string. What are some of the ways you might use string? (child tries). Yes, those are fine. You can also use string to attach a fish hook, to jump rope, to sew with, to hang clothes on, and to pull shades. There are lots more too and yours were good examples. Now I’m going to name different objects and I want you to tell me all the different ways you could use the object that I name.

Individual items for both forms of the divergent thinking test may be found in Appendix C.

The mean group scores of the Alternate Uses Test were used in the analyses. The number of acceptable total responses (associational fluency), the number of
acceptable different categories of responses (spontaneous flexibility), and the number of original responses were scored.

This measure of divergent thinking was chosen due to the large number of validity studies with children that have been done for the measure (Kogan, 1983). The test was individually administered. No overall time limit was set for each child so that time would not affect the number or quality of responses obtained (Wallach & Kogan, 1965). Any individual item was terminated if the child indicated he or she was finished or after a silence of one minute.

**Intelligence.** The WISC-R (Wechsler, 1974) Vocabulary and Block Design subtests were administered in order to obtain an estimate of intelligence. The entire WISC-R was not administered in order to keep time of testing for each child to a minimum. The Vocabulary and Block Design subtests were chosen because they both show excellent reliability, correlate highly with the Full Scale IQ score over a wide age range, and are together a good measure of "g" (Sattler, 1988). These two standard scores were converted to an estimated full scale score via the method recommended by Sattler (1988). This estimate of intelligence was used to control for the effects of the children's intelligence.
and verbal fluency when investigating affect in play as a moderator variable.

**Affect in Play Scale.** This scale was developed (Russ, 1987) as a standardized measure of affective expression in children's play. The instructions for the play task (Russ, 1993) state:

It is important that the play objects and task to be observed be unstructured enough so that individual differences in fantasy play can emerge. The play task utilizes 2 neutral looking puppets, one boy and one girl, and three small blocks which are laid out on a table. It is administered individually to the child. The instructions for the task for the free-play period are:

I'm here to learn about how children play. I have here two puppets and would like you to play with them any way you like for five minutes. For example, you can have the puppets do something together. I also have some blocks that you can use. Be sure to have the puppets talk out loud. The video camera will be on so that I can remember what you say and do. I'll tell you when to stop.

The child is informed when there is one minute left. If the child stops playing during the 5' period, the prompt, "you still have time left, keep going" is given. The task is discontinued if the child can not play after a two minute period.

Four major scores from the Affect in Play Scale were used for this study. The first score is total frequency of affect, measured as total number of scorable units of affective expression. A unit can be the expression of an affect state, an affect theme, or a combination of the two. The second score used from the Affect in Play Scale was comfort in play, a measure of
the child's enjoyment of and involvement in the play. Comfort is scored on a 1 to 5 scale. The third score used from the Affect in Play Scale was global quality of fantasy, scored on a 1 to 5 rating scale and based on subscores of organization, elaboration, imagination, and repetition. Lastly, an integration of affect score was computed by multiplying global quality of fantasy by frequency of affect. The Affect in Play Scale coding manual is presented in Appendix D.

Interrater reliability with the Affect in Play Scale has been good, ranging from .73 to .96 for the scores used in this study (Russ, 1993). A split-half reliability for frequency of affective expression, comparing the 2nd and 4th minutes with the 3rd and 5th minutes of the play period obtained $r = .85$ (Russ and Peterson, 1990). There is also a growing body of validity studies with the scale (Russ, 1993).

The scores obtained from the Affect in Play Scale were analyzed as moderator variables. Affective expression, comfort, and integration were expected to moderate the effects of induced mood on children's divergent thinking abilities.

**Specific Hypotheses**

The major hypotheses of this study were that induced happy, sad, and angry moods would affect the
divergent thinking of children. More specifically, it was predicted that positive affect would facilitate divergent thinking in children. That is, positive mood induction should predict increased divergent thinking scores. Thus:

1. The change scores obtained by children in the positive mood induction group should be positive and significantly greater than zero.

Although effects on divergent thinking were predicted for the negative mood induction groups, the direction of these effects was not clear. As already reviewed, previous research has obtained mixed findings. Thus:

2. The change scores obtained by children in the sad mood induction group should be significantly greater than zero. Whether the change is in a positive or a negative direction is not predicted.

3. The change scores obtained by children in the angry mood induction group should be significantly greater than zero. Whether the change is in a positive or a negative direction is not predicted.

The secondary hypotheses of this study were that children’s ability to express and integrate affect in their play would serve as a moderator variable for the effects for positive and negative affect. Children’s
ability to express affect in play, their comfort with affective expression, and the overall quality of their play should act as moderator variables in the influence of mood on divergent thinking.
Results

Affect In Play Scale Interrater Reliability

Play Scale interrater reliabilities were calculated for 20 randomly selected children from the total sample. The second rater was another graduate student who had extensive experience scoring the Affect In Play Scale. Pearson product moment correlations were calculated for each of the play scale scores. The interrater reliabilities were as follows: total frequency of affect, $r(20) = .97$, $p < .001$; global quality of fantasy, $r(20) = .89$, $p < .001$; comfort, $r(20) = .72$, $p < .001$; organization, $r(20) = .81$, $p < .001$; elaboration, $r(20) = .50$, $p = .018$; imagination $r(20) = .78$, $p < .001$; and repetitiveness, $r(20) = .89$, $p < .001$. With the exception of elaboration, all of the interrater reliabilities were judged to be adequate. However, the scores for organization, elaboration, imagination, and repetitiveness were only used to obtain the global quality of fantasy score and were not utilized in any further analyses. Although the interrater reliability for frequency of affect is excellent ($r = .97$) the mean score is elevated: the mean frequency of affect obtained by the primary investigator on the total sample was 19.38, while the mean frequency of affect obtained by the second rater on
the 20 randomly selected protocols was 12.80.

**Mood Induction Manipulation Check**

The reliability of the mood induction was tested via a 3 x 4 Chi square analysis (induced mood by reported mood). This analysis reached statistical significance ($X^2(6, \ N = 96) = 105.18, p = .01$; See Table 3). The positive mood condition was the most successful: 32 out of 32 children who were assigned to the happy mood condition pointed to the smiling face to indicate their mood following the mood induction. The negative mood conditions obtained lower, but still acceptable validity. Induced/reported concordance for the sad mood condition was 59.38% and for the angry mood condition was 62.50%. However, during the data collection a number of children expressed some confusion regarding the neutral face and confused it with either sad or angry mood. In addition, the negative mood conditions lacked purity, with children reporting the same remembered events (e.g., being teased by other children) for the different mood conditions (sad or angry). If one calculates the concordance rate in the sad and angry induced mood conditions for reported mood being not happy (i.e., a negative versus positive mood contrast) then the percentages rise to 84.4% for the sad mood condition and 93.75% for the angry mood condition.
Descriptive Data

Means and standard deviations for all measures are reported in Table 4. The mean scores for the WISC-R intelligence measures are slightly above average. The mean Vocabulary subtest score is 11.68 with a standard deviation of 3.05 and the mean Block Design score is 11.22 with a standard deviation of 3.26.

Means and standard deviations are reported separately for girls and boys in Table 5. There were no statistically significant gender differences on the divergent thinking tests or on the intelligence tests. On the Affect in Play Scale several gender differences emerged. All ten children who were unable or refused to complete the play task were boys. All of the girls in the sample completed the play task. In addition, girls engaged in more organized \( (p < .05) \) and better quality \( (p < .01) \) play, and were more comfortable \( (p < .01) \) engaging in this play, than were boys.

The mean score for frequency of affect on the Affect in Play Scale is noticeably higher than that obtained in previous research. Whereas previous research has obtained mean frequency of affect scores of approximately 10 \( \text{(see, Russ, 1993)} \) this study obtained a mean frequency of affect score of 19.38. This elevated mean is an artifact of the scoring, as was already
discussed. It is noteworthy that the median score on this measure was 10. In addition, the distribution of frequency of affect scores was not normal (kurtosis = 18.81, skewness = 3.73) and included two outlier values. Therefore all analyses that involved the amount of affect scores from the Affect in Play Scale were calculated twice: initial calculations used the raw scores while secondary calculations utilized transformed scores. The scores were transformed by taking the logarithm of the obtained scores (Stevens, 1986).

Divergent Thinking Residualized Change Scores

As planned, divergent thinking residualized change scores were obtained for fluency (number of responses), flexibility (number of categories of responses), and originality (number of responses given by fewer than 5% of the sample). These residualized change scores were obtained by first calculating a multiple regression predicting the post-test mood induction scores from the pre-test mood induction scores. The residuals of this multiple regression were labeled as the change scores and were then used as the dependent measures for further analyses.

Residualized change scores were analyzed rather than simple change scores due to the problems associated with simple change scores (Cohen and Cohen, 1983).
According to Cohen and Cohen (1983) one problem with simple change scores involves the reliability of the difference score, which will be lower than the reliability of the variables being compared. This low reliability will then reduce correlations with other variables. Another problem with simple change scores involves their necessary correlations with prescores and postscores, which are similar to part-whole correlations, and which may be spurious. This dependence of change scores on prescores can cause artifactual results such that apparent significant differences, or apparent nonsignificant differences, are not reflecting true individual differences in change but are instead reflecting measurement error. (See Cohen and Cohen, 1983, pp. 415-427, for a detailed explanation of the statistical problems with using simple change scores and the superiority of residualized change scores.)

**Main Analyses**

The main hypotheses of this study were not supported by the main analyses. The residualized change scores generated for these analyses may be found in Table 6.
A series of analyses were calculated to examine for mean differences on the residualized change scores across the mood conditions. An alpha level of .05 was used for all statistical tests.

First, the main hypotheses regarding the effects of mood on divergent thinking were tested. Three oneway (1 x 3) ANOVAs examined for mean differences on the fluency, flexibility, and originality change scores by the 3 mood conditions. These ANOVAs failed to reach statistical significance (fluency, $F(2,93) = .60, p = .55$; flexibility, $F(2,93) = 1.70, p = .19$; originality, $F(2,93) = 2.35, p = .10$).

Next, a planned 3 x 2 MANOVA of mood by gender was run. This analysis also failed to reach statistical significance. The MANOVA of mood by gender resulted in no significant main effect for mood ($F(6,178) = 1.08, p = .38$), for gender ($F(3,88) = 1.07, p = .37$), or for the interaction of the two ($F(6,178) = .52, p = .79$).

**Collapsed Mood Analyses**

Positive versus negative mood analyses were then calculated. For this set of analyses, the two negative mood conditions were collapsed and then contrasted with the positive mood condition. Means and standard deviations for the residualized change scores in the
collapsed negative mood condition may be found in Table 6.

Mean differences between the positive mood condition and the collapsed negative mood condition were calculated for the three divergent thinking residualized change scores of fluency, flexibility, and originality. Children in the collapsed negative mood condition obtained originality residualized change scores ($M = .08, SD = .52$) that were significantly greater than the originality residualized change scores obtained by children in the positive mood condition ($M = -.16, SD = .46$), $t(94) = 2.31, p < .05$. The results for fluency and flexibility were not statistically significant.

A MANOVA of collapsed mood (positive mood versus negative mood) by gender on the divergent thinking change scores did not reach statistical significance. The 2 x 2 (collapsed mood x gender) MANOVA obtained an effect for mood of $F(3,90) = 2.04, p = .11$.

**Successful Mood Induction Analyses**

A subsequent set of analyses next examined the hypothesis that the effects for the negative mood induction groups were weakened due to low effectiveness of the mood induction procedure. This set of analyses only examined data collected from children who indicated that the mood induction was successful (pointed to the
correct face for the mood condition).

Residualized change scores were once again generated. Means and standard deviations for these change scores for the three mood conditions may be found in Table 9.

The main hypotheses regarding the effects of mood on divergent thinking were first tested. Three oneway (1 x 3) ANOVAs examined for mean differences across the three mood conditions on each of the divergent thinking residualized change scores. The effect for mood was found to be significant for the flexibility residualized change score ($F(2,68) = 3.65, p = .03$), with the happy mood group’s mean flexibility score ($-21$) being less than the angry group’s mean flexibility score ($-17$) and the sad group’s mean flexibility score ($-18$). Thus, for those children who reported a successful mood induction, the positive mood induction resulted in a decrease in flexibility, whereas the negative mood induction resulted in an increase in flexibility. The effect for mood did not reach statistical significance for fluency ($F(2,68) = 1.01, p = .37$) or for originality ($F(2,68) = 3.03, p = .06$).

Next, the two negative mood conditions were collapsed and then contrasted with the positive mood condition, again only examining the data for those
children who indicated a successful mood induction. Means and standard deviations for the residualized change scores in the collapsed negative mood condition, only for children who indicated a successful mood induction, may be found in Table 9.

Mean differences between the positive mood condition and the collapsed negative mood condition were examined for the three divergent thinking residualized change scores of fluency, flexibility, and originality. The children in the collapsed negative mood condition obtained flexibility residualized change scores ($M = .17, SD = .59$) that were significantly greater than the flexibility residualized change scores obtained by children in the positive mood condition ($M = -.21, SD = .60$), $t(69) = 2.68, p < .01$. In addition, the children in the collapsed negative mood condition obtained originality residualized change scores ($M = .13, SD = .54$) that were significantly greater than the originality residualized change scores obtained by children in the positive mood condition ($M = -.16, SD = .45$), $t(69) = 2.47, p < .05$. The results for fluency were not statistically significant.

Thus, positive mood induction was associated with the actual divergent thinking flexibility and originality scores being less than the predicted scores,
whereas negative mood induction was associated with the actual divergent thinking flexibility and originality scores being greater than the predicted scores. That is, the positive mood induction resulted in a decrease in flexibility and originality, whereas negative mood induction resulted in an increase in flexibility and originality.

**Simple Change Score Analyses**

The difficulties of using simple change scores has already been described. In spite of these serious problems with using simple change scores, a series of simple change scores was generated to explore the data further.

The first set of simple change scores examined the differences pre-test to post-test in the three mood conditions. For fluency, in the happy mood condition, the pre-test scores were greater than the post-test scores ($p < .05$). For fluency, in the sad mood condition and in the angry mood condition the results were nonsignificant. For flexibility, in each of the three mood conditions the post-test scores were greater than the pre-test scores ($p < .01$). For originality, in each of the three mood conditions, the post-test scores were greater than the pre-test scores ($p < .05$). Thus, in these analyses using simple change scores, it appears
that there has been an increase in divergent thinking flexibility and originality following each of the mood induction procedures.

One possibility regarding the results obtained by the analyses that used residualized change scores was that perhaps the mood induction was mild and wore off before the end of the divergent thinking post-test. To examine this possibility a series of analyses using simple change scores was generated. First, the effects pre-test to post-test on the first two items of the divergent thinking measures versus the effects pre-test to post-test on the last two items of the divergent thinking measures were compared. The change scores pre-test to post-test on the first two items of the divergent thinking test, for both fluency and originality, were nonsignificant in each of the three mood conditions. For flexibility, the post-test scores were greater than the pre-test scores on the first two items ($p < .05$). Examining pre-test to post-test change scores on the last two items obtained nonsignificant results for fluency in all three mood conditions. Significant results were obtained pre-test to post-test on the last two items of the divergent thinking test for both flexibility ($p < .001$) and originality ($p < .001$). These results do not support the idea that the effects
of the mood induction decreased from the first two items of the post-test to the last two items of the post-test.

Next, change scores were generated comparing the amount of change pre-test to post-test on the first two items versus the last two items. These analyses were nonsignificant for the fluency score in all three mood conditions. For flexibility, in all three mood conditions the amount of change obtained on the last two items was significantly greater than the change obtained on the first two items \( (p < .05) \). For originality, in all three mood conditions, the change obtained on the last two items was also significantly greater than the change obtained on the first two items \( (p < .01) \). These results suggest that the amount of change obtained pre-test to post-test on the divergent thinking flexibility and originality scores increased from the first two items to the last two items.

Divergent thinking post-test change scores were next generated between the first two items of the post test to the last two items of the post-test. These results were statistically nonsignificant for both fluency and flexibility in each of the three mood conditions. For originality, in each of the three mood conditions, the scores obtained on the last two items of the post-test were greater than the scores obtained on
the first two items of the post-test ($p < .01$). These results do not support the possibility that the effects of the mood induction were greater for the first two items than for the last two items because, in fact, the scores on the last two items of the post-test were greater than the scores on the first two items of the post-test. One possible reason for these results is that the last two items of the post-test were easier for children to generate original answers to than were the first two items of the post-test.

**Secondary Analyses**

The next set of planned analyses continued to analyze the effect of mood on divergent thinking but now included children’s ability to express affect in play as measured by the Affect in Play Scale as a moderator variable. That is, the analyses next tested the hypotheses that perhaps controlling for children’s ability to express and modulate affect in play will result in differential effects of mood on divergent thinking. These hypotheses were tested in two different ways.

The first way in which children’s play was examined as a moderator variable was by creating groups of better and worse players. These groups were created on the bases of affect expressed in play and quality of play
generated. Four groups of children were generated: high affect and high quality, high affect and low quality, low affect and high quality, low affect and low quality. This division resulted in uneven groups, with the majority of children being in either the high affect and high quality group or in the low affect and low quality group. Further information regarding these groups may be found in Tables 7 and 8.

Three oneway (1 x 4) ANOVAs examined mean differences in divergent thinking residualized change scores across the four groups of better and worse players. These ANOVAs did not obtain statistically significant results (fluency, $F(3,89) = 1.63, p = .19$; flexibility, $F(3,89) = 1.90, p = .14$; originality, $F(3,89) = 2.12, p = .10$).

Further MANOVA analyses of mood by players were not initially planned and lack adequate numbers of subjects to be reliable. In spite of this limitation, an exploratory analysis of mood by players (4 x 3) while controlling for intelligence was calculated. This analysis did not reach statistical significance (effect for players $F(9,240) = 1.5, p = .15$, effect for mood $F(6,158) = .33, p = .92$, effect for players by mood $F(18,240) = .66, p = .85$).

Another way to examine the question of whether
children’s play moderates the effect of mood on divergent thinking is to compute an affective integration score. An affective integration score was computed by multiplying the Affect in Play Scale scores of affective frequency and quality (Russ, 1993).

A one way (1 x 3) ANCOVA of mood, controlling for integration, was nonsignificant ($F(6,176) = .93, p = .48$). The same analysis, controlling for both intelligence and integration, was also not significant ($F(6,174) = .86, p = .53$). A 3 x 2 MANCOVA of mood by gender, controlling for integration, resulted in nonsignificant results on main effect for mood ($F(6,170) = .99, p = .43$), for gender ($F(3,84) = 1.10, p = .35$), and for the interaction of the two ($F(6,170) = .53, p = .78$). Controlling for both intelligence and integration had similar results (main effect of mood $F(6,168) = .91, p = .49$, main effect of gender $F(3,83) = .97, p = .41$, mood by gender interaction effect $F(6,168) = .53, p = .79$). When the three mood conditions were collapsed into a positive versus negative contrast and affective integration was controlled for as a covariate, the effect for collapsed mood was $F(3,86) = 1.91, p = .13$. Because the affective integration score is computed utilizing the frequency of affect scores, as already indicated these analyses were rerun using the
transformed frequency of affect scores. Utilizing the transformed scores did not result in any significant changes in results.

**Affect in Play Scale and Divergent Thinking**

Although not the focus of the study, exploratory analyses examined the relationship between the divergent thinking data and the play scale data. Pearson product moment correlations were calculated to examine the relationship between the Affect In Play Scale scores and the Divergent Thinking change scores as well as the Divergent Thinking raw scores. These correlations were calculated in several conditions: for all children, for girls and boys, and for each of the three mood conditions.

As already noted, analyses involving the frequency of affect scores were calculated both before and after transforming the data. The frequency of affect scores were transformed via a logarithmic transformation to compensate for a skewed distribution and several outlier values. When the data were transformed most of the significant correlations with the Affect In Play Scale frequency of affect score were sharply reduced, indicating that much of the apparent statistical relationship was in fact due to the artifact of the skew and outliers. Therefore, all following discussions of
the results that involve the frequency of affect score will only be based on the transformed frequency data.

When, as in these correlational analyses, the sample is split and the number of subjects is reduced, some stability is lost from the data. In addition, when many correlations are calculated, clearly some will be significant purely by chance. For these reasons, only clear and consistent patterns of results in the data will be discussed. In spite of this cautionary measure, it is still important to bear in mind when interpreting these results that they are exploratory in nature.

When correlations were calculated for all boys, regardless of mood condition, significant, positive correlations were obtained for boys between the originality residualized change score and the play scale scores of organization, \( r(37) = .38, p = .01 \); elaboration, \( r(37) = .44, p = .003 \); repetitiveness, \( r(37) = .37, p = .01 \); overall quality, \( r(37) = .36, p = .01 \); and overall comfort, \( r(47) = .32, p = .01 \). Trends toward significance emerged between the originality change score and the play scale imagination, \( r(37) = .25, p = .07 \), and frequency of affect, \( r(47) = .28, p = .06 \), scores. Correlations between the other divergent thinking change scores (fluency and flexibility) and the affect in play scale measures were generally close to
The intercorrelations of the raw divergent thinking scores (in contrast to the change scores) and the play scale scores for just described (see Table 10). Significant, positive correlations between the Play Scale scores and the post-test originality scores of the divergent thinking measure appear consistently. However, this relationship does not hold for the pre-test divergent thinking scores. The correlations between the Play Scale scores and the pre-test divergent thinking scores are not significant.

Correlations between the Affect In Play Scale scores and the divergent thinking originality scores obtained for children who underwent the sad mood induction are presented in Table 11. The patterns of results obtained in the sad induced mood condition are similar to those obtained for boys. Once again the divergent thinking originality change score and the raw originality post-test score correlated at statistically significant levels with the Affect In Play measures. In the sad mood condition, the significant correlations were obtained only for those Affect In Play scores that load on the cognitive factor and not for the frequency of affect score.
Discussion

The main hypotheses of this study, that induced happy, sad, and angry moods would affect the divergent thinking of children, specifically, with positive mood having a facilitative effect, were not supported by the main analyses. That is, analyses of the residualized change scores across the three mood conditions did not support the main hypotheses that the mood inductions would affect the divergent thinking of the children. Analyses that collapsed the three mood conditions into a simplified positive versus negative mood contrast did obtain significance for originality of divergent thinking, with negative mood induction resulting in increased originality and positive mood resulting in decreased originality.

Subsequent analyses, examining only that data collected from children who indicated a successful mood induction, also obtained significant results. For children who indicated that the mood inductions were successful, the sad and angry mood inductions resulted in an increase in divergent thinking flexibility and the happy mood induction resulted in a decrease in divergent thinking flexibility.

When the angry and the sad mood conditions were collapsed and contrasted with the happy mood condition,
significant results were obtained for both flexibility and originality. Negative mood induction was associated with an increase in flexibility and originality of divergent thinking and positive mood induction was associated with a decrease in flexibility and originality of divergent thinking.

Thus, negative affect facilitated the ability to shift between categories of associations, enabling more categories of responses to be generated. In addition, negative affect facilitated the ability to generate more original responses. In contrast, positive affect inhibited the ability to shift between categories of associations and it inhibited the ability to generate more original responses.

These results are consistent with the results obtained by Tighe (1992). Tighe (1992) found that participants in the positive mood condition wrote stories that were rated as less creative than the stories that were written in the negative or neutral mood conditions. However, these results are not consistent with the majority of the mood induction and creativity literature that has found a facilitative effect for positive affect on creativity (Isen, Daubman, & Nowicki, 1987; Greene & Noice, 1988; Jausovec, 1989; Adaman, 1991).
Exploratory Simple Change Score Analyses. A series of simple change score analyses was generated in order to explore the data further. Due to the statistical problems inherent in using simple change scores for this type of research, it is important to keep in mind the exploratory nature of these analyses when interpreting the results.

Overall, the simple change scores showed a pattern of significant differences such that the post-test scores were greater than the pre-test scores for divergent thinking flexibility and originality (not fluency), supporting the main hypotheses of the study. This pattern of results was the same for each of the three mood conditions. It appears, in these analyses using simple change scores, that the mood inductions have resulted in an increase in the flexibility and originality of the children's divergent thinking.

Thus, the analyses using residualized change scores and the analyses using simple change scores have both contrasting and complementary results. The main analyses using residualized change scores did not obtain significant results whereas the analyses using simple change scores did obtain significant results. It was only by collapsing the negative mood conditions and by analyzing only that data from children who indicated a
successful mood induction that significance was obtained with the residualized change scores. Thus, it was only by maximizing the reliability of the mood inductions that significance was obtained with the residualized change scores, whereas simple change scores obtained significant results in initial analyses.

Further, in both sets of analyses, flexibility and originality were significantly affected by the mood inductions. However, in the analyses with the residualized change scores, positive mood was associated with a decrease in flexibility and originality. In contrast, in the analyses with the simple change scores positive mood was associated with an increase in flexibility and originality. The results for the negative mood induction conditions do not differ by type of analysis as do the results for the positive mood induction condition.

It is impossible to be certain to which factors to attribute the different results obtained with the simple change score analyses as compared to the results obtained with the residualized change score analyses. One possible explanation for these results is that real change was detected by the less rigorous statistical test. That is, perhaps the results reflect a small
effect size for the mood inductions on divergent thinking.

An alternative possibility to explain the different results obtained with the residualized change scores and the simple change scores involves the difficulties involved with using simple change scores. These statistical difficulties and the possibility of obtaining spurious results, have already been discussed. Further research is necessary to investigate these alternative explanations. However, the results are encouraging and support the continuation of research in this specific area.

Secondary Hypotheses

The secondary hypotheses of this study, that children’s ability to express and integrate affect in their play would serve as a moderator variable for the effects for positive and negative affect, were not supported. Children’s ability to express affect in play, their comfort with affective expression in play, and the overall quality of their play did not act as moderator variables in the influence of mood on divergent thinking.

**Better and worse players.** One of the ways that children’s play was examined as a moderator variable was by creating groups of better and worse players, on the
bases of affect expressed in play and quality of play generated. Four groups of children were generated: high affect and high quality, high affect and low quality, low affect and high quality, low affect and low quality.

Some brief comment on the groups of players generated is necessary. The high affect and high quality group clearly includes the best players while the low affect and low quality group clearly includes the worst players. The picture for the other two groups is less clear however. The high affect and low quality group expressed a greater than average amount of affect in their play but did so in an unorganized and out of control manner. These are children who are unable to control or modulate their expression of affect and are considered to be poor players for this reason. In contrast, the low affect and high quality group organized their play well but were constricted in their expression of affect. They are not out of control (in fact they are constricted) but their ability to express affect is also impaired.

As already described, this division resulted in uneven groups, with the majority of children being in either the high affect and high quality group or in the low affect and low quality group. The results obtained
when mean differences in divergent thinking change scores were examined for these four groups of better and worse players were not significant. However, it is important to note that these analyses were limited by low power. The low affect, high quality group had only eleven children and the high affect, low quality group had only ten children. In spite of the low power of these analyses, the significance levels obtained are much lower than those obtained with other analyses. Although these results are not statistically significant and therefore uninterpretable for the current study, they point to an intriguing area for further research.

Methodological Issues

Durability of the mood induction. A series of analyses examined the possibility that the mood induction was mild and wore off before the end of the divergent thinking post-test. A series of analyses using simple change scores did not generate any support for this hypothesis. In fact, the simple change scores indicate that the amount of change obtained pre-test to post-test on the divergent thinking flexibility and originality scores increased from the first two items to the last two items. In addition, in all three mood conditions, the originality scores obtained on the last two items of the post-test were greater than the
originality scores obtained on the first two items of the post-test.

The most likely explanation for these results is that the last two items of the post-test were easier for children to generate divergent responses to than were the first two items. One alternative hypothesis to explain these results is that the effects of the mood induction increased rather than decreased. Another alternative hypothesis is that, over the course of the divergent thinking tests, the children learned how to generate more responses and more original responses.

Method of mood induction. This study utilized a cognitive mood induction. This mood induction procedure and the research supporting it have already been described in detail in this paper. However, to briefly summarize again why this mood induction procedure was chosen, it is the mood induction that has been used in previous successful mood induction research with 2nd and 3rd grade children (e.g., Harris & Siebel, 1975; Moore, Underwood, & Rosenhan, 1973; Rosenhan, Underwood, & Moore, 1974) and also has established validity (Silverman, 1986).

The mood induction procedures that have focused specifically on the effects of mood on creativity have been different from the mood induction procedure used in
this study. While this study employed a cognitive mood induction, other studies have employed mood induction procedures that might be described as more experiential.

Isen, Daubman, & Nowicki (1987) induced positive affect by showing subjects a few minutes of a comedy film or by giving them small bags of candy. Negative affect was induced via a film. Greene & Noice (1988) induced positive affect by giving compliments regarding the subjects’ clothing, hair and/or jewelry as well as a packet of gum. Jausovec (1989) induced positive and negative moods via films. Adaman (1991) induced positive and negative moods through musical tapes. Thus, previous research that has successfully linked induced positive mood and increased creativity has induced that mood via viewing films, giving gifts and compliments, and listening to music.

Tighe’s (1992) research did in fact induce positive and negative moods via short films and found significant results for the positive mood condition, but these results were in the opposite direction to those of the studies just reviewed. Tighe (1992) found that participants in the positive mood condition wrote stories that were rated as less creative than the stories that were written in the negative or neutral conditions. Interestingly, however, her measure of
creativity (original stories written by the participants) differs from the measures of creativity usually seen in mood induction research. Other research has tended to measure creativity via problem solving tasks and divergent thinking measures.

Kauffman & Vosburg (1994), who found nonsignificant results, did not in fact use an induced mood condition. Rather they measured individuals' mood via an adjective check list and grouped people according to their naturally occurring mood conditions. A cognitive mood induction, such as that done in the current research, has not been shown in previous research to affect creativity.

Therefore, one possible explanation for the results obtained in this study may be that different types of mood inductions may result in different affective and/or cognitive processes. Perhaps obtaining increased creativity through mood induction is dependent on the type of mood induction performed (and also on the type of creativity measure used). Although the cognitive mood induction has been successfully used to obtain other sorts of effects (Harris & Siebel, 1975; Moore, Underwood, & Rosenhan, 1973; Rosenhan, Underwood, & Moore, 1974; Silverman, 1986), perhaps it is not the right sort of mood induction to facilitate creative
thinking. This possibility speaks to the complexity of creativity, of affective processes, and of the ways in which they interact.

**Complexity of mood conditions.** Important to consider in this discussion are the results obtained in this study when the mood conditions were collapsed. Significant results were obtained with residualized change score analyses when the mood conditions were simplified to a positive versus negative contrast.

As already discussed, children displayed a great deal of overlap in the angry and sad mood conditions. Children often chose similar situations to evoke the two negative mood conditions. For example, the situation "when someone teases me" was commonly given by children for both the sad and angry mood conditions (although, obviously, by different children). Utilizing two negative mood conditions (sad and angry) as well as a positive mood condition introduced more complexity and variance into the mood induction than was originally anticipated.

Further research should focus first on assessing effects simply for positive versus negative moods on creativity. Given the lack of clarity in the literature for these effects, splitting the positive or negative
mood conditions, as was done in this study, appears to have been premature.

Methods of assessing change. Another important methodological difference of this study compared to other research that has investigated the effects of mood on creativity lies in its means of assessing change. Previous research has compared mean differences of scores on various creativity tasks among mood and control groups. This study, in contrast, examined change scores; divergent thinking was measured both before and after the mood induction procedure and residualized change scores were generated.

Assessing residualized change scores instead of group differences in this way is more rigorous test of change than is comparing mean differences and a stronger effect size is required to detect change (Maxwell & Howard, 1981). Further research should begin to examine for effect sizes when significant results are obtained for mood on creativity.

Ages of participants. One final important difference between this study and previous studies examining the link between mood induction and creativity is in the age of individuals who participated in the research. In this research, the creative thinking of second and third grade children was studied. Other
research has tended to focus on young adults and adolescents. College students have been most commonly studied (e.g., Isen, Daubman, & Nowicki, 1987; Jausovec, 1989; Adamson, 1991; Tighe, 1992). Senior high school students ages 17 to 21 were studied by Kauffman & Vosburg (1994) while 8th grade students were the research subjects for Greene & Noice (1988). As more research is done examining the link between induced mood and creativity, it will be interesting to see what role cognitive and affective development plays in this process.

Affect in Play Scale Exploratory Analyses

Previous research with the Affect in Play Scale (Russ & Peterson, 1990; D’Angelo, 1995) has found that the scores of the play scale tend to load on two separate factors. These factors have been described as affective and cognitive. Frequency of affect, as well as two scores not utilized for this study (intensity of affect and categories of affect generated), load on the affective factor. The other scores (organization, elaboration, imagination, repetitiveness, overall quality, and overall comfort) all load on the cognitive factor.

Exploratory analyses in this research obtained patterns of correlations between the divergent thinking
originality scores and the cognitive factor of the play scale. For boys, when affect was stimulated, the divergent thinking originality change score was significantly, positively correlated with the Affect in Play Scale scores of organization, elaboration, repetitiveness, overall quality, and overall comfort. That is, boys who displayed increased creativity also engaged in better quality (more fantasy) play and were more comfortable engaging in this unstructured play.

A similar relationship between originality and play emerged in the sad mood condition. For both boys and girls the divergent thinking originality change scores were significantly correlated with the play scale scores of organization, repetitiveness, and overall quality. For children in the sad mood condition, increased creativity was related to better quality (more fantasy) play.

Significant patterns of correlations were not obtained for the other divergent thinking change scores of fluency (overall number of responses) and flexibility (number of categories of responses). Only the increased number of original responses given was related to children’s play.
Play and Divergent Thinking

The patterns of correlations found in this study both contrast and complement previous research. Two previous research studies with the Affect in Play scale have found affective expression in play to be correlated with divergent thinking (Russ & Grossman-McKee, 1990; Russ & Peterson, 1990). In both of these studies each of the scores on the Affect in Play Scale, with the exception of non-primary process affect, were significantly, positively correlated with divergent thinking for first and second grade children. In addition, neither of these studies obtained any gender differences in these correlations.

The absence of gender differences in research examining the relationship between divergent thinking and affective expression, as measured by the Affect in Play Scale, has stood in contrast to research examining the relationship between divergent thinking and affective expression as measured by the Rorschach. A number of studies have examined the relationship between primary process expression on the Rorschach and divergent thinking. A consistent finding (Russ, 1993) has been significant, positive correlations for boys, but not for girls. Other play and creativity literature (e.g., Lieberman, 1977; Singer & Rummo, 1973) has
similarly tended to find positive correlations for boys more often than for girls.

Thus, the gender difference found in this study, significant correlations between divergent thinking and affective expression in play for boys but not for girls, is one that is surprising even though it does complement some previous research. It is surprising because the Affect in Play Scale has been the one measure of affective expression and of play that has not obtained such gender differences.

Possible reasons why this gender difference emerged will be discussed. The first important point to note is that these significant correlations are between affect in play and the divergent thinking change scores as well as the divergent thinking post-mood induction scores. That is, affective expression in play did not correlate with the divergent thinking pre-mood induction scores for boys or girls. This is an important difference because previous research with the Affect in Play Scale has not utilized a mood induction. Research with the Rorschach has also not utilized a mood induction, however, the Rorschach is well known by clinicians to be very affectively stimulating for many children and adults. Thus, affective stimulation prior to the divergent thinking test and/or prior to the
administration of the Affect in Play Scale may play an important role.

The explanation is not likely to be quite this simple, however, for two reasons. First, although in the Russ & Grossman-McKee (1990) study the divergent thinking test was administered after the Rorschach, in the Russ & Peterson (1990) study the Rorschach and the Divergent thinking measures were given in separate testing sessions, and each was the first test administered in the sessions. Further, this explanation does not explain the surprising finding in this research that the Affect in Play Scale did not correlate with the divergent thinking pre-mood induction scores for boys or girls. Replication of both the Russ & Grossman-McKee (1990) as well as the Russ & Peterson (1990) studies would require not only an absence of gender differences, but also significant, positive correlations between the Affect in Play Scale scores and the divergent thinking scores.

Another important difference between this study and the two Affect in Play Scale studies lies in the order of administration of the tests. In the Russ & Grossman-McKee (1990) study as well as in the Russ & Peterson (1990) study the Affect in Play Scale was administered on a different day and by a different examiner than was
the divergent thinking measure. In this research all of the test measures were given on the same day, by the same examiner, with the divergent thinking measures given first and the Affect in Play Scale given last.

Administering the play scale at the end of the testing session, after the mood induction, the divergent thinking tests, and the intelligence is certainly a different condition for the play scale than is administering it at the beginning of the test session. There is currently not enough research to indicate exactly what effect this different order of administration would have, however, it may explain in part the different correlations obtained with the divergent thinking measure.

Implications for Future Research

Future research exploring what roles affective processes play in creativity should continue to explore the methodological issues raised by the present study and their theoretical implications. Specifically, the effect of utilizing different types of mood inductions should continue to be explored. It will be important to see which affective processes affect creativity. It will also be important to examine how strong an affective process needs to be to impact creativity. Utilizing change scores instead of examining group
differences, as well as examining for effect sizes of any change obtained would be especially useful in this regard.

The results of this research are consistent with previous research that indicates children’s ability to engage in unstructured play is related to their ability to engage in creative, free-association thinking. Future creativity research with children should continue to explore these links. While this research examined correlational links, future research should begin to explore directions of causality.


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Appendix A

Parent Permission Form for Midwestern City

CASE WESTERN RESERVE UNIVERSITY

May, 1992

Dear Parent:

I am a doctoral candidate in the Psychology Department at Case Western Reserve University. I am seeking your permission to work with your child in a study investigating mood and creativity of children. The effects of positive and negative moods on the creative thinking of children is an important area of study in child development and is related to intellectual development and school functioning. This study would be my dissertation research. My advisor for this research is Sandra Russ, Ph.D., a child psychologist on the faculty of the Psychology Department at Case Western Reserve University.

All 2nd and 3rd grade students are being asked to participate in this study. The study would involve your child meeting with me for one 10 minute session during the school day. Each child will be asked to remember a time in the past when he or she felt a particular emotion (happy, sad, or angry). In addition, each child will be given a problem-solving task, a vocabulary measure, and a puzzle problem to solve. Children will also be videotaped playing with puppets. All students will remain anonymous and individual student results will be confidential. No individual results will be shared with the school. Only group results of the study will be reported to the school. This study is not focused on any one child, but rather on learning about the effects of mood on creative thinking.

I will send you a copy of the group results of the study if you are interested.

Thank you,

[Signature]

Hilary Katz, M.A.
Doctoral Candidate
Case Western Reserve U.

Sandra Russ, Ph.D.
Professor, Department of Psychology
Case Western Reserve University

I give my permission for my child _______ to participate in the research study with Hilary Katz, M.A.

Parent's Signature

I would like a copy of the results. Yes ____ No ____

Department of Psychology

Case Western Reserve University
11300 Euclid Avenue
Cleveland, Ohio 44106-7152

Phone: 216-368-8286
Fax: 216-368-4491

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Dear Parent:

I am a doctoral candidate in the Psychology Department at Case Western Reserve University in Cleveland, Ohio. I am seeking your permission to work with your child in a study investigating mood and creativity of children. The effects of positive and negative moods on the creative thinking of children is an important area of study in child development and is related to intellectual development and school functioning. This study would be my dissertation research. My advisor for this research is Sandra Russo, Ph.D., a child psychologist on the faculty of the Psychology Department at Case Western Reserve University.

The study would involve your child meeting with me for one 40 minute session during the school day. Each child will be asked to remember a time in the past when he or she felt a particular emotion (happy, sad, or angry). In addition, each child will be given a problem-solving task, a vocabulary measure, and a puzzle problem to solve. Children will also be videotaped playing with puppets. All students will remain anonymous and individual student results will be confidential. No individual results will be shared with the school. Only group results of the study will be reported to the school. This study is not focused on any one child, but rather on learning about the effects of mood on creative thinking. Only a random sample of students with permission will actually participate in the study.

I will send you a copy of the group results of the study if you are interested.

Thank you,

Hilary Katz, M.A. Sandra Russo, Ph.D.
Doctoral Candidate Professor, Department of Psychology
Case Western Reserve U. Case Western Reserve University

Date

I do/do not give my permission for my child to participate in the research study with Hilary Katz, M.A.

Parent's Signature

I would like a copy of the results: Yes ___ No ___

Department of Psychology
Appendix C

Instructions and Items
for the Divergent Thinking Test

Instructions:

Now, I am going to name an object, any kind of object, like a light bulb, and it will be your job to tell me all the different ways that the object could be used. Any object can be used in a lot of different ways. For example, think about string. What are some of the ways you might use string? (child tries). Yes, those are fine. You can also use string to attach a fish hook, to jump rope, to sew with, to hang clothes on, and to pull shades. There are lots more too and yours were good examples. Now I'm going to name different objects and I want you to tell me all the different ways you could use the object that I name.

Alternate Form A:

1. Knife -- Tell me all the different ways you could use a knife.

2. Automobile Tire -- Tell me all the different ways you could use an automobile tire -- either the tube or the outer part.

3. Chair -- Tell me all the different ways you could use a chair.

4. Key -- Tell me all the different ways you could use a key -- the kind that is used in doors.

5. Pencil -- Tell me all the different ways you could use a pencil.

6. Telephone book -- Tell me all the different ways you could use a telephone book.

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Alternate Form B:

1. Newspaper -- Tell me all the different ways you could use a newspaper.
2. Button -- Tell me all the different ways you could use a button -- the kind that is used on clothing.
3. Cork -- Tell me all the different ways you could use a cork.
4. Shoe -- Tell me all the different ways you could use a shoe.
5. Stick -- Tell me all the different ways you could use a stick.
6. Box -- Tell me all the different ways you could use a box.
Appendix: Affect in Play Scale

The Affect in Play Scale measures the amount and kinds of affective expression in children's fantasy play. The scale rates the frequency and intensity of affective expression, variety of affect categories, quality of fantasy, quality of integration of affect, and comfort in play. Play sessions are 5-minute standardized puppet play periods.

Affective expression consists of the occurrence of affective content themes and actual emotional expression. Conceptually, the Affect in Play Scale taps three dimensions of affect in fantasy:

1. Actual affective experiencing through expression of feeling states.
2. Affective content themes, including primary process themes.
3. Cognitive integration and modulation of affect. This dimension is reflected in the combination of quality of fantasy scores and affect scores.

THE PLAY TASK

It is important that the play objects and task to be observed be unstructured enough so that individual differences in fantasy play can emerge. The Play Task utilizes two neutral-looking puppets, one boy and one girl, and three

mall blocks that are laid out on a table. It is administered individually to the child. The instructions for the task for the free-play period are:

I'm here to learn about how children play. I have here two puppets and would like you to play with them any way you like for 5 minutes. For example, you can have the puppets do something together. I also have some blocks that you can use. Be sure to have the puppets talk out loud. The video camera will be on to that I can remember what you say and do. I'll tell you when to stop.

The child is informed when there is 1 minute left. If the child stops playing during the 5-minute period, the prompt, "You still have time left. Keep going" is given. The task is discontinued if the child can not play after a 2-minute period.

SCORES

There are eight major scores.

1. Total frequency of units of affective expression. A unit is defined as one scoreable expression by an individual puppet. In a two puppet dialogue, expressions of each puppet are scored separately.
2. Variety of affect categories. There are 11 possible affect categories, the last 6 of which are primary process categories. The categories are: Happiness/ Pleasure, Anxiety/Fear, Sadness/Hurt, Frustration/Displeasure, Nurturance/ Affection, Oral, Oral Aggression, Anal, Sexual, Aggression, and Competition.
3. Mean intensity of affective expression (1-5 rating).
4. Mean intensity $\times$ frequency score.
5. Comfort in play score (1-5 global rating).
7. Mean quality of fantasy, based on subscores of organization, elaboration, imagination, and repetition.
8. Affective integration scores.
   a. Mean quality & mean intensity
   b. Mean quality $\times$ frequency
   c. Mean quality & mean intensity $\times$ frequency

GENERAL PRINCIPLES FOR INTENSITY RATINGS

All of the affect intensity ratings are based on the expression of content themes and actual experiencing. "I like this hot dog" is comprised of both
an affective content theme (hot dog—oral) and an emotional expression (like). In general, combinations of the emotion and content themes get higher intensity ratings than the theme alone or the emotion alone. The general criteria for the 1–5 intensity ratings are:

1. Reference to affective content alone.
2. Reference to affective content with special emphasis, which implies experiencing (such as personal referent).
3. Current experiencing, which includes:
   a. moderate action alone
   b. current feeling state with conversational voice
   c. primary process theme plus mild feeling state
4. Stronger current experiencing which includes:
   a. mild action plus mild feeling state
   b. strong action alone
   c. strong affect alone
   d. for primary process categories, unusual and strong feeling or strong theme word
   e. primary process theme and moderate affect
5. Very strong feeling state, which includes:
   a. action plus strong feeling state
   b. extreme primary process theme work, almost inappropriate
   c. extremely strong affect
   d. extremely strong action

In general, affective theme, emotional expression (word, tone, facial expression, etc.), and action are additive components.

SPECIFIC CATEGORY CRITERIA FOR INTENSITY RATINGS

Aggression

1. Reference to aggressive content.
   Ex: Here's a toy gun; here's a knife; this is broken.
2. Personalized reference to aggressive content, mild bickering.
   Ex: I have a knife; I'll break it; let's fight; no—I don't want to do that.
3. Actual fighting, hitting, tussling; destroying other's property; aggressive dialogue with feeling; angry feeling statement “I am mad.”
   Ex: I don't want to do that—that's stupid (with feeling); I'll punch you; I don't like you. Let's fight (with feeling).
SPECIFIC CATEGORY CRITERIA FOR INTENSITY RATINGS

   Ex: Hitting plus "You're stupid": I hate you; here is a bomb and it's
going to explode.
5. Strong action and strong dialogue: extreme emotional theme.
   Ex: I'll kill you: I'm going to beat your brains to a pulp; actions of
   shooting or stabbing.

Nurturance/Affection

1. Reference to nurturing affectionate themes.
   Ex: Sally and John are friends: yesterday my mom helped me.
2. Personalized nurturing theme or theme with special emphasis.
   Ex: Are you ok?; I'll help; don't forget your sweater: Sally and
   John are best friends.
   Ex: I like you. You're my friend; gift-giving; patting; helping,
   handshake.
4. Action plus dialogue: strong verbal statement or strong action.
   Ex: Hugging; dancing; I really like you; you're my very best friend.
5. Strong action plus strong dialogue: very strong nurturing action or
   word.
   Ex: I love you; I really like you (while patting or hugging).

Happiness/Pleasure

1. Reference to content involving happiness, pleasure, satisfaction,
general preference statements.
   Ex: That dress is pretty; Saturday is the best day of the week; that's
   nice.
2. Reference with special emphasis: personalized; affective content
distanced by past/future or 3rd person tense. Subjective references
to fun and amusement.
   Ex: Johnny looks happy; that was fun; oh boy, the circus is in
town; that's good; I like this red hair.
3. Current affective experiencing or activity involving happiness.
   pleasure. Happiness themes plus feeling state.
   Ex: I feel happy (conversational); hand-clapping; I love to get
   presents; I like this (with strong tone); this is fun.
4. Activity plus affective expression. Strong feeling state: strong
   action alone (jumping up and down with happy expression).
   Ex: I feel happy (more than conversational); it's so wonderful to be
   happy; whee. this is fun; I really like that; I love this.
5. Combination of two of the following: emotional expression, theme, or activity (at least one at extreme level or 2 at strong level). Extreme emotional wording also scored.
Ex: I love this (with action): Jumping and laughing.

Anxiety/Fear

1. Referent to fearful theme.
Ex: Oh—it's time for school; it's time to go to the doctor.
2. Mild anticipation with hint of negative consequence.
Ex: Oh no—I broke the teacher's ruler; uh-oh, I dropped my book.
3. Fearful theme with mild affect: more direct references to consequences; withdrawal or fleeing activity.
Ex: We're gonna get in trouble; let's hide; there's a monster over there; I see a ghost.
4. Clear expression of fear; combination of theme and strong affect.
Ex: I'm scared; the monster's coming after me; Mom's gonna spank me (with feeling).
5. Withdrawal activity plus fear; strong theme plus fearful affect.
Ex: I'm scared, he'll kill us; don't let him hurt me (while hiding).

Sadness/Hurt

1. Nonpersonalized reference to sadness/hurt (conversational tone).
Ex: Sally got hurt yesterday; Joe was in the hospital.
2. Personalized reference to sadness/hurt (conversational) or nonpersonalized reference with exclamation.
Ex: Sally was crying yesterday?; sometimes I cry.
3. Current experience of sadness/hurt stated in conversational tone; action of sadness/hurt.
Ex: That's sad; that hurts; I'm sad; I have a headache; please don't leave me.
4. Statement of sadness/hurt with sad/hurt action; stronger verbal statement; more intense sad action (experiencing).
Ex: Ouch that hurts!; boy am I sad; please don't leave me!: whimpering, whining.
5. Strong verbal statement of sadness/hurt with action; use of very strong sad/hurt words; or very intense current experiencing of sadness/hurt.
Ex: crying-sobbing-moaning in pain; that hurts (while crying); I don't what to go (while crying).
Frustration/Disappointment/Dislike

1. Reference to frustration/disappointment; nonpersonalized statement of frustration/disappointment (conversation voice).
   
   Ex: It fell; math is boring; she seems bored.

   
   Ex: I'm not good at building; I'm not a good drawer; it fell (with affect).

3. Current experience of frustration/disappointment (conversational tone); current action of frustration/disappointment.
   
   Ex: This is hard; I'm bored; I can't do this; clicking tongue.

4. Statement of frustration/disappointment with an action; statement of current experience of frustration/disappointment (exclamation); stronger action of frustration/disappointment.
   
   Ex: I can't get this (while knocking down blocks); boy is this hard!; this is a rotten day; oh darn!

5. Stronger statement of frustration/disappointment with an action; very strong statement of experiencing frustration/disappointment; very strong action of frustration/disappointment.
   
   Ex: Slamming down the blocks while saying, "I can't do this!"—crying in frustration; swearing; I hate this!

Competition

1. Reference to competitive games.
   
   Ex: Mentioning cops and robbers, checkers, hide and seek.

2. Personal reference to competitive games.
   
   Ex: Let's play tag; let's see who can run the fastest.

3. Game playing with action, competitive theme with mild affect.
   
   Ex: Playing hide and seek; I like to win; I don't want to lose; I like to play tag.

4. Action plus affect; strong feeling state.
   
   Ex: Playing tag and saying "I win"; I'm going to beat you (with feeling); playing tag and saying, "Got you".

5. Action plus strong feeling state.
   
   Ex: Playing tag and then saying, "I'm king of the mountain."

Oral

1. Reference to oral content—food, cooking, mouth, stomach.
   
   Ex: Here's an ice cream shop; this is a new special cheese; here's your mouth.
APPENDIX: AFFECT IN PLAY SCALE

2. Personalized reference to oral content or content with special emphasis.
   Ex: Let's eat dinner; I'll feed you: there's an ice cream shop!: Johnny is hungry.
3. Current experiencing that includes eating behavior or emotional word in conjunction with oral content.
   Ex: I like candy; I am hungry; I don't like spaghetti: that food looks good: actual eating behavior.
4. Eating behavior plus affective content: oral theme word plus moderate affective expression in voice or facial expression.
   Ex: Mmmmmmm—this is good candy; I hate spaghetti: this soup is yechy; I really like cake.
5. Strong eating behavior plus strong affective expression.
   Ex: Wow this is great (while eating); this soup is awful (while eating).

Oral Aggression

1. Reference to oral-aggressive themes.
   Ex: Teeth, dentist, poison. Dracula.
2. Personal referent to oral aggressive theme: more intense theme word; special emphasis.
   Ex: Let's go to the dentist; my tooth hurts; that dog has big teeth: he'll bite me.
3. Reference plus mild affect; activity.
   Ex: Sticking out tongue, biting; I'll bite you (with feeling).
4. Reference plus strong affect; activity plus affect.
   Ex: Biting with feeling; this is poison (yech).
5. Very strong affect and activity.
   Ex: Eating people; Dracula attacks other puppet and bites.

Anal

1. Reference to anal content (i.e., cleanliness, making a mess, dirt, sloppy).
   Ex: This is a mess; that's dirty; it's time to clean up.
2. Personalized reference to anal content or impersonal reference with special emphasis.
   Ex: I made a mess; I'll get dirty; be careful not to make a mess (special emphasis with be careful).
3. Reference to anal content plus mild affect.
   Ex: That's a real mess!: I don't like dirt; I like to play in the mud.
   Ex: I really like making a mess; yech—this is a mess; gross—how can you play in the mud; anal jokes.
5. Strong anal activity plus strong current experiencing; extreme anal theme word; strong expression of disgust around dirt; sense of inappropriate reference.
   Ex: Oh-how-awful. look at this mess; look, he pooped.

Sexual

1. Reference to mild sexual material.
   Ex: Look at his lips.
2. Personalized referent of referent with special emphasis.
   Ex: I'm going to get undressed; puppets sleeping together with sexual overtones; Sally and Joe are boyfriend and girlfriend; reference to dates.
3. Mild activity or sexual content with feeling state.
   Ex: I like to kiss; hugging if sexual context.
4. Sexual activity plus feeling, or strong sexual content.
   Ex: Dancing; kissing; looking under dress.
5. Extreme sexual content or strong activity.
   Ex: Strong kissing; blatant sexual jokes; reference to genitalia.

QUALITY OF FANTASY

Organization (Rate from 1 to 5):

1. Series of unrelated events.
2. Some cause and effect: series of loosely related events.
3. Cause and effect, organized in a temporal sequence, but no overall integrated plot.
4. More cause and effect, close to an integrated plot.
5. Integrated plot with beginning, middle, and end.

Elaboration (Rate from 1 to 5):

1. Boring, simple themes with no embellishment.
2. Minimal embellishment.
3. Much embellishment, but only in one or two dimensions.
4. Moderate embellishment across many dimensions.
5. Much embellishment across many dimensions—many details, high activity, sound effects, changes in voice, lots of facial expression and verbal inflection.
Imaginativeness (Rate from 1 to 5):

1. Based primarily on daily experience: no "new twists."
2. Several events slightly removed from daily experience (e.g., eating in a restaurant).
3. Many events slightly removed from daily experience or reference to a common childhood fantasy as being a fantasy (e.g., "Let's pretend to be cops and robbers").
4. Use of common childhood fantasy.
5. New twist on common childhood fantasy or uncommon childhood fantasy.

Repetitiveness (Rate from 1 to 5):

1. Very repetitive; perseverative quality (e.g., "This is a dog," "This is a house," etc., over and over).
2. Very repetitive, but less perseverative quality.
3. Moderate amount of repetition—similar themes, but differences within them (e.g., going to school several times, but doing something different each time—field trip, math, recess).
4. Moderate amount of repetition—less similar themes.
5. Not repetitive.

Overall Quality (Rate from 1 to 5):

This is a global rating that is made after reviewing the play rating period. It is based upon a weighted combination of the above four quality dimensions. The organization dimension is used as an anchor point. All of the other dimensions are used to either inflate or deflate the score.

Overall Comfort (Rate from 1 to 5):

This is a global rating that is made after reviewing the play rating period. The lower end of the scale considers comfort more than enjoyment, whereas the higher ratings weigh pleasure and involvement more heavily.

1. Reticent; distressed.
2. Some reticence; stiffness.
3. O.K., but not enjoying or involved.
4. Comfortable and involved.
5. Very comfortable, involved, and enjoying.
Table 1

Descriptive Statistics By City Where Data Was Collected

<table>
<thead>
<tr>
<th></th>
<th>Midwestern $^a$</th>
<th>Western $^b$</th>
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$^aN = 20; \text{ Play Scale } N = 18. \quad ^bN = 76; \text{ Play Scale } N = 75.\quad \text{Note.} \quad \text{None of the mean differences between cities are statistically significant.}
Table 2

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*N = 77; Play Scale N = 75.  *N = 12; Play Scale N = 12. *p < .05.
### Table 3

**Reliability of Mood Induction: Subjects' Reported Mood Following the Mood Induction**

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<thead>
<tr>
<th>Mood Reported</th>
<th>Mood Induced</th>
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<tr>
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<td>3</td>
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<tr>
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<tr>
<td>Neutral</td>
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*Note.* $X^2(6, N = 96) = 105.18$, $p = .01$
Table 4

Means and Standard Deviations for Measures for the Total Sample

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<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
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<tr>
<td><strong>Form A</strong></td>
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<tr>
<td>Fluency</td>
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<td>Vocabulary</td>
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<td><strong>Affect In Play Scale</strong></td>
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<tr>
<td>Frequency of Affect</td>
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<td>29.54</td>
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<tr>
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<td>Elaboration</td>
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<tr>
<td>Imagination</td>
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<tr>
<td>Repetitiveness</td>
<td>2.82</td>
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<tr>
<td>Overall Quality***</td>
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<td>1.34</td>
</tr>
<tr>
<td>Comfort</td>
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<td>1.37</td>
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</table>

*N = 96. *N = 93 (83 on measures that exclude Play Scale noncompleters). *Play Scale noncompleters were given a score of 0.
### Table 5

**Descriptive Statistics by Gender**

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<th>Boys</th>
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<td>Form A</td>
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<td>Fluency</td>
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<td>Form B</td>
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<td>Originality</td>
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<td>.78</td>
<td>.72</td>
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<tr>
<td>WISC-R^a</td>
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<td></td>
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<tr>
<td>Block Design</td>
<td>11.13</td>
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<td>11.31</td>
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<td>Vocabulary</td>
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<td>2.90</td>
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<td>1.17</td>
<td>2.66</td>
<td>1.37</td>
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</tbody>
</table>

^aN = 48.  ^bN = 46 for girls; N = 47 for boys (37 on measures that exclude Play Scale noncompleters).
^*p < .05.  ^^p < .01.
Table 6

Divergent Thinking Residualized Change Scores: Means and Standard Deviations

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<td>Boys</td>
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<table>
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</table>

Table 7

Affect In Play Scale Scores for Better and Worse Players: Frequency of Affect, Overall Quality, and Affective Integration

<table>
<thead>
<tr>
<th>Integration</th>
<th>Hi Affect&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Lo Affect&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Hi Affect&lt;sup&gt;d&lt;/sup&gt;</th>
<th>Lo Affect&lt;sup&gt;e&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hi Quality</td>
<td>Lo Quality</td>
<td>Hi Quality</td>
<td>Lo Quality</td>
</tr>
<tr>
<td>Mean</td>
<td>117.97</td>
<td>20.45</td>
<td>58.70</td>
<td>3.49</td>
</tr>
<tr>
<td>SD</td>
<td>94.04</td>
<td>12.34</td>
<td>61.69</td>
<td>5.03</td>
</tr>
<tr>
<td>Frequency of Affect</td>
<td>Mean</td>
<td>33.73</td>
<td>5.64</td>
<td>42.60</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>24.73</td>
<td>2.58</td>
<td>59.77</td>
</tr>
<tr>
<td>Overall Quality</td>
<td>Mean</td>
<td>3.49</td>
<td>3.45</td>
<td>1.70</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>.69</td>
<td>.69</td>
<td>.48</td>
</tr>
</tbody>
</table>

<sup>a</sup>High affect ≥ 10, low affect < 10, high quality ≥ 3, low quality ≤ 2.
<sup>b</sup>N = 37.  <sup>c</sup>N = 11.  <sup>d</sup>N = 10.  <sup>e</sup>N = 35.
Table 8

Divergent Thinking Pre-Test and Post-Test Scores for Better and Worse Players

<table>
<thead>
<tr>
<th></th>
<th>Hi Affect</th>
<th>Lo Affect</th>
<th>Hi Affect</th>
<th>Lo Affect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hi Quality</td>
<td>Lo Quality</td>
<td>Hi Quality</td>
<td>Lo Quality</td>
</tr>
<tr>
<td>Form A (pre-test)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>3.92</td>
<td>3.32</td>
<td>3.77</td>
<td>3.26</td>
</tr>
<tr>
<td>SD</td>
<td>2.50</td>
<td>1.04</td>
<td>1.13</td>
<td>1.32</td>
</tr>
<tr>
<td>Flexibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>2.25</td>
<td>2.05</td>
<td>2.55</td>
<td>1.90</td>
</tr>
<tr>
<td>SD</td>
<td>.92</td>
<td>.68</td>
<td>.91</td>
<td>.51</td>
</tr>
<tr>
<td>Originality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>.99</td>
<td>.58</td>
<td>1.10</td>
<td>.40</td>
</tr>
<tr>
<td>SD</td>
<td>2.03</td>
<td>.47</td>
<td>.82</td>
<td>.44</td>
</tr>
<tr>
<td>Form B (post-test)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>3.66</td>
<td>2.95</td>
<td>3.73</td>
<td>2.87</td>
</tr>
<tr>
<td>SD</td>
<td>1.83</td>
<td>1.28</td>
<td>.97</td>
<td>1.31</td>
</tr>
<tr>
<td>Flexibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>2.60</td>
<td>1.98</td>
<td>2.78</td>
<td>1.92</td>
</tr>
<tr>
<td>SD</td>
<td>1.25</td>
<td>.91</td>
<td>.83</td>
<td>.81</td>
</tr>
<tr>
<td>Originality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>1.22</td>
<td>.76</td>
<td>1.03</td>
<td>.58</td>
</tr>
<tr>
<td>SD</td>
<td>1.30</td>
<td>.56</td>
<td>.76</td>
<td>.53</td>
</tr>
</tbody>
</table>

*High affect > 10, low affect < 10, high quality ≥ 3, low quality ≤ 2.

*N = 37.*  *N = 11.*  *N = 10.*  *N = 35.*
<table>
<thead>
<tr>
<th>Mood</th>
<th>Fluency</th>
<th>Flexibility</th>
<th>Originality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy Mooda</td>
<td>-.16</td>
<td>-.21</td>
<td>-.16</td>
</tr>
<tr>
<td>Sad Moodb</td>
<td>.17</td>
<td>.18</td>
<td>.12</td>
</tr>
<tr>
<td>Angry Moodc</td>
<td>.09</td>
<td>.17</td>
<td>.14</td>
</tr>
<tr>
<td>Negative Mood (collapsed)d</td>
<td>.13</td>
<td>.17</td>
<td>.13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluency</td>
<td>.17</td>
<td>1.09</td>
</tr>
<tr>
<td>Flexibility</td>
<td>.18</td>
<td>.69</td>
</tr>
<tr>
<td>Originality</td>
<td>.12</td>
<td>.56</td>
</tr>
<tr>
<td>Fluency</td>
<td>.09</td>
<td>.85</td>
</tr>
<tr>
<td>Flexibility</td>
<td>.17</td>
<td>.49</td>
</tr>
<tr>
<td>Originality</td>
<td>.14</td>
<td>.54</td>
</tr>
<tr>
<td>Fluency</td>
<td>.13</td>
<td>.96</td>
</tr>
<tr>
<td>Flexibility</td>
<td>.17</td>
<td>.59</td>
</tr>
<tr>
<td>Originality</td>
<td>.13</td>
<td>.54</td>
</tr>
</tbody>
</table>

Table 10

**Pearson Product-Moment Correlations Among Affect In Play Scale and Divergent Thinking Originality Scores for Boys In All Mood Conditions**

<table>
<thead>
<tr>
<th>Affect In Play Scale</th>
<th>Resid. Change Scores</th>
<th>Pre-Test Scores</th>
<th>Post-Test Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of Affect&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.28</td>
<td>.09</td>
<td>.24</td>
</tr>
<tr>
<td>Organization&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.38&lt;sup&gt;**&lt;/sup&gt;</td>
<td>.18</td>
<td>.36&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>Elaboration&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.44&lt;sup&gt;**&lt;/sup&gt;</td>
<td>.18</td>
<td>.40&lt;sup&gt;**&lt;/sup&gt;</td>
</tr>
<tr>
<td>Imagination&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.25</td>
<td>.28&lt;sup&gt;*&lt;/sup&gt;</td>
<td>.33&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>Repetitiveness&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.37&lt;sup&gt;**&lt;/sup&gt;</td>
<td>.17</td>
<td>.35&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>Overall Quality&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.36&lt;sup&gt;**&lt;/sup&gt;</td>
<td>.17</td>
<td>.34&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>Comfort&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.32&lt;sup&gt;**&lt;/sup&gt;</td>
<td>.11</td>
<td>.28&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup>N = 32.  <sup>b</sup>N = 37.  <sup>c</sup>N = 47.  
<sup>*</sup>p < .05.  <sup>**</sup>p < .01.
Table 11

**Pearson Product-Moment Correlations Among Affect In Play Scale and Divergent Thinking Originality Scores for the Sad Mood Condition for the Total Sample**

Divergent Thinking Originality Scores

<table>
<thead>
<tr>
<th>Affect In Play Scale</th>
<th>Resid. Change Scores</th>
<th>Pre-Test Scores</th>
<th>Post-Test Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of Affect*</td>
<td>.12</td>
<td>.01</td>
<td>.10</td>
</tr>
<tr>
<td>Organization*</td>
<td>.44**</td>
<td>.09</td>
<td>.36*</td>
</tr>
<tr>
<td>Elaboration*</td>
<td>.28</td>
<td>.19</td>
<td>.30</td>
</tr>
<tr>
<td>Imagination*</td>
<td>.23</td>
<td>.25</td>
<td>.30</td>
</tr>
<tr>
<td>Repetitiveness*</td>
<td>.43**</td>
<td>.12</td>
<td>.37*</td>
</tr>
<tr>
<td>Overall Quality*</td>
<td>.39*</td>
<td>.10</td>
<td>.33*</td>
</tr>
<tr>
<td>Comfort*</td>
<td>.23</td>
<td>-.05</td>
<td>.13</td>
</tr>
</tbody>
</table>

*N = 26.  †N = 28.  ‡N = 32.  *p < .05.  ††p < .01.