A Cross-Sectional Experimental Study on Mindfulness and Divergent Thinking: The Effects of Novelness and Conditionality

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A Cross-Sectional Experimental Study on Mindfulness and Divergent Thinking: The Effects of Novelness and Conditionality

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A Cross-Sectional Experimental Study on Mindfulness and Divergent Thinking: The Effects of Novelness and Conditionality

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Abstract

A cross-sectional experiment was performed to determine if the novelness of a stimulus and the conditionality of its presentation would have any effect on the subjects' mindfulness and divergent thinking. Age and gender differences were also considered. Seventy-two high school and seventy-two college students were randomly assigned to one of six conditions. Each subject was given either a novel or familiar stimulus which was described by the experimenter either unconditionally, conditionally, or not at all, and each was asked to produce a list of possible uses for the object. The length of each list and the variety of responses were measured and compared. The results showed no significant differences between the experimental conditions, genders, or age groups, nor were there any significant interaction effects. Possible explanations for the results were discussed, and suggestions were made for further research.
A Cross-Sectional Experimental Study on Mindfulness and Divergent Thinking: The Effects of Novelness and Conditionality

Racial killings, teenage suicides, a failing education system - our country faces many problems. In the face of these problems, many individuals seem stuck in habitual modes of thought, unable to creatively confront their dilemmas. Is it possible that cognitive psychology can help each of us confront our own problems by helping us think more creatively about them?

In this paper, I will explore this possibility by employing the concepts of, and research on, mindfulness, creativity, and divergent thinking. Then I will describe an experiment which further probes these constructs in an effort to suggest potential solutions to some of society's problems.

Mindfulness

Concept of Mindfulness. Ellen J. Langer is the leader in research on mindfulness. She defines mindfulness in a number of different ways. In research she did with Justin Brown, she explains that mindfulness begins with attention to the context in which information is presented (Brown and Langer, 1990). By considering context, we may realize the differences between present and past situations and be able to perceive the present situation in different ways. Langer adds, "This ability to transcend context is the essence of mindfulness and central to creativity in any field" (Langer, 1989). Langer, Janis, and Wolfer (1975, as cited by Langer, 1989) report that patients in a hospital were successfully taught how to reduce the amount of perceived pain associated with surgery. These individuals were taught to imagine themselves either playing football or preparing
for a large dinner party. The researchers hypothesized that pain perceived in either of these two situations (e.g., being bruised in a tackle or cutting oneself on a knife when the dinner guests are about to arrive) goes relatively unnoticed because of the other, more stimulating thoughts and behaviors at the time. However, one likely perceives pain as much greater when no other sources of stimuli are present onto which one may focus his/her attention. Hospital staff who were unaware of the researchers’ hypothesis monitored the progress of each patient. Those in the experimental condition (i.e., those who were taught to view their presence in the hospital in a non-threatening way) left the hospital sooner and had to take fewer pain killers while hospitalized than the control group (Langer, 1989). Thus, our interpretation of a situation depends highly on our mindfulness - whether we can see beyond the present context.

In order to see beyond the present, most obvious context, we must openly welcome new information, Langer’s second definition of mindfulness (Brown and Langer, 1990; Langer, 1989). This ability is a basic function in all human beings, although it is certainly not always utilized. When individuals perceive stimulation patterns as unchanging, they tend to view the the situation as "boring" and ignore any changes, especially subtle ones (like the double word in this sentence!). Only a mindful individual is likely to notice changed signals in the present context of reading, listening, or seeing. Langer suggests that any resulting behavior is more likely to be effective since it is from a knowledge base that has been collected with more insight (1989).

With this new information, we must be ready to accept new points of view, Langer’s third definition of mindfulness. Often, when considering one’s own situation, one
may attribute one's own problems to external circumstances (e.g., "I hit nothing but red lights on the way here.") while tending to attribute others' actions to their dispositional traits (e.g., "Tom is always late for meetings. He must be an irresponsible person."). This human tendency is called the fundamental attribution error (Baron and Byrne, 1994). Once we mindfully become aware of the numerous possibilities behind others' behaviors we can begin to accept more than our own myopic views. For example, people may have a good rationale for their behaviors that we label negative. Until we are willing to listen to them and open up ourselves to new points of view, we doom ourselves to a mindless, negative perspective of others (Brown and Langer, 1990; Langer, 1989).

One becomes mindful when one becomes aware of situation and context, two indications that the present situation is different from past situations in which mindsets may have been developed (Langer, 1989). Once situation and context are considered, new information is welcomed, and/or new points of view are weighed, one may create new categories in one's thinking. The creation of new categories, then, constitutes Langer's fourth definition of mindfulness (Brown and Langer, 1990; Langer, 1989). As will be discussed later, these new categories may foster one's ability to think in creative and divergent ways.

Langer emphasizes the prevalence of mindlessness in today's society, as we all tend to cling helplessly to rules and categories and ignore situation and context (Langer, 1989; Langer and Piper, 1987). Mindlessness can result from repeated experiences (Langer and Imber, 1979, as cited by Langer and Weinman, 1981) and from just one exposure to information, provided the person unconditionally and/or uncritically accepts that
information (Chanowitz and Langer, in press, as cited by Langer and Weinman, 1981). When we encounter a situation, we often do so with a mental set, which is the tendency to use a familiar approach developed from similar past experiences rather than a novel, more appropriate approach (Matlin, 1994). Langer calls this a premature cognitive commitment (1989), because we have prematurely taken on the meaning for a situation from the past without fully analyzing and reacting to the present situation. Most people engage in premature cognitive commitments frequently in their everyday lives in a systematic and somewhat "arational" way (Langer, Blank, and Chanowitz, 1978). Before proceeding, a person may not weigh the situational information, but may instead proceed simply on the situational cues that seemingly warrant regular participation in the interaction. For example, someone unable to find a screwdriver may need to find an alternative item to use as a tool. Having created a premature cognitive commitment for a dime, a letter opener, and a zipper pull could prevent him or her from acting mindfully to create a substitute screwdriver.

Mindlessness is not always a bad trait. For example, grasping an axe by the handle rather than the blade without thinking will likely save an individual from injury. One might even refer to mindlessness as "habit" in many situations. "Habits" are described by Harry Fowler (1965) as the most prevalent drive affecting human behavior. Langer elaborates this by defining this most prevalent drive as an evolutionary process which maximizes energy, because habit (or "satisficing") allows one to exert the least amount of effort to get a job done satisfactorily (Fowler, 1965). William James suggests that habit is so
important in our chaotic society that it is this "most precious conservative agent" which keeps our lives in balance (James, 1892/1985).

Cognition is "a generic term for any process whereby an organism becomes aware or obtains knowledge of an object" (English and English, 1958, as cited by Horrock, 1969 - original italics). This process can include perception, recognition, conception, judgment, and/or reasoning toward an object, person, or event (Horrock, 1969). Two terms are particularly important in this discussion of cognition in adolescents and adults: schema and set. Both essentially mean the same thing - a mental representation of how things in the world run (Ault, 1977; Wade and Tavris, 1990). This elementary memory system is part of a habituation process which makes learning more efficient. In other words, procedures from the past are resurrected in order to solve challenges in the present. In this way, energy is saved by not having to produce a new solution with each new problem a person faces in life. Generally, schema are an asset, but such a procedure or attitude from the past can become a mindset, and this may prevent the production of new, original thoughts. When this functional fixedness occurs, one must attempt to see beyond the premature cognitive commitments to allow creativity to take place (Matlin, 1994). This process will be discussed later in this essay.

Nevertheless, habits often become harmful, because they can render us unable to change our attitudes or behaviors. Some have suggested that societal mindlessness has been fostered primarily by our goal-oriented education system (Langer, 1989). Result, rather than process, has been the focus encouraged by many teachers, as kids tend to
wonder "Can I do it?" rather than "How can I do it?" Perhaps a shift is necessary in our educational system so that mindfulness can be fostered in the students.

Mindlessness has been exploited with various populations throughout history as well. Langer explains that rules are used best to guide people rather than to dictate their behaviors (1989). Adolf Hitler and Jim Jones, to name just two men in history, took advantage of mindlessness in their effort to bring people underneath their power. Each of them repeated their ideologies so many times that people no longer paid attention to what was said and accepted it as truth. This state of mindlessness produced a condition called learned helplessness.

**Research on Mindfulness.** Many researchers have studied variables affecting mindfulness between individuals, including age, conditionality, and novelness. Barron (1969) theorizes that children begin life "innocent in the face of fate" and it is society's challenge to create conditions both in life and in education that will allow them to become functional, creative members of society. He calls this innocent, childlike thought "prelogical." The disappearance of prelogical thought and the appearance of reason come gradually with age, says Barron, but when exactly does this change take place?

Langer (1989) states that mindfulness is natural in children, as they seem to avoid mindsets and are able to focus on the present without much influence of the past. According to Eisenberg's observations (1965), the biological, social, and psychological development in the process of maturation from childhood into adolescence are all interrelated. Certainly, many teenagers are preoccupied with their biological (e.g. muscular) and social (e.g. peer group) development, but many don't consciously focus as
much on their psychological development. Perhaps, as older teenagers begin to mature and egocentrism lessens, they are unknowingly developing psychologically - cognitively, interpersonally, and intrapersonally.

Schimek did a study on intellectualization in adolescents - i.e. the "cognitive way of handling one's affairs" (1968, as cited by McCandless, 1970). The study showed relatively consistent results in a series of studies on subjects aged 10, 14, 17, and 24. Despite the consistency of thought in different ages in Schinek's study, much validity is found in Piaget's stages of cognitive development which indicate quite different styles of cognition in young people. Piaget's first two stages, sensorimotor and preoperational, are often found in children age six and younger. The two stages which I want to discuss more thoroughly are concrete operational and formal operational (McCandless, 1970). Piaget called the concrete operational stage "intrapositional," because most of the thought during this stage is within the confines of a single proposition or idea (Flavell, 1977). This rigidity of thought is the main characteristic of the concrete operational stage, which often begins about age seven. Those in this stage are often identified by having "unswaying logic" as they work on classification of and relationships between people and things (McCandless, 1970). Those at the concrete level work on this classification when encountering new objects or people. They first attend to the concept, and then must discriminate from other, similar objects. Once they have formed a mental representation of it, they can store it in secondary memory for future use. When the same or similar object or person is experienced again, he or she must retrieve the stored representation of it from secondary memory and test the present perception with it to determine its
similarity. As children mature, "they are able to discriminate more attributes and less obvious attributes of objects [or people]" (Klausmeier and Allen, 1978).

As this cognitive maturity occurs, a person progresses toward Piaget's formal operational stage. Questions exist as to the potential ages of onset of this stage of thought. Most agree that it usually does not occur until at least age thirteen or fourteen (Lovell, 1968, as cited by Manaster, 1977). An interesting study of adolescents just past this level was performed by Eagle (1965, as cited by McCandless, 1970). This study focused on the cognition of eighth graders (approximately aged 14-15), and two relevant cognitive styles were found. "Tolerance of ambiguity" in unclear stimuli and "semantic spontaneous flexibility" (i.e. divergent thinking, which will be discussed later) were present in a number of the eighth graders. Each of these is related to formal operational thought, indicating at least the possibility of onset of formal thought at this age.

Although formal operational thought often emerges during adolescence, this is frequently not the characteristic type of thought exercised in one's teens (Martorano, 1974, as cited by Flavell, 1977; Santrock, 1992). Higgins-Trenck and Gaite claim that most adolescents will not reach formal operational thought until their late teens or early twenties, if at all (1971, as cited by Manaster, 1977). Many adults, whether they are or are not capable of it, do not exercise formal operational thought (Lovell, 1968, as cited by Manaster, 1977; Santrock, 1992).

Piaget terms his fourth stage "interpropositional," as it involves logical relations between two or more propositions or ideas (Flavell, 1977). In addition, one using formal thought typically is systematic in his/her relating of items, planful and strategic in
processing information, abstract and hypothetical in thinking, and able to consider and
experiment with ideas both physically and mentally (Atkinson, Atkinson, Smith, and Bem,
1990; Flavell, 1977; Horrocks, 1969; Manaster, 1977; McCandless, 1970). These
elements are all very important in the implementation of divergent thinking, as they allow
the individual to produce and progressively consider a number of concepts (Ault, 1977).

Arlin further broke down formal operational thought into two substages (1975, as
cited by Manaster, 1977). The first, problem-solving, occurs when one can logically solve
a solvable problem when it is given. The second substage, problem-finding, involves
scientific thought and is reached by far fewer people. In it, one does not need to be given
a problem, as he/she can identify one spontaneously before solving it.

In establishing his four levels of cognition, Piaget suggested that the majority of
adults are only able to think formally in areas where they have particular trouble or have
great interest or expertise (1972, as cited by Flavell, 1977). Flavell himself pointed out
that "...the higher the cognitive-developmental stage, the less universal its attainment is
likely to be" (1977).

More recent research has been done that has confirmed aspects of Piaget's
theories. Ruth Ault (1977) defines rules as "statements which specify a relationship
between two or more concepts," and these relationships often develop through
experiences. Rules are very similar to schema (which were discussed earlier), as they both
form a mental representation of our view of the world. Groupings are made by people in
order to form these relationships. One study found that young children prefer to make
functional-relational groupings (i.e. functional fixedness, which is characteristic of
concrete operational thought), while older children, perhaps adolescents, sought
"categorical-superordinate and analytic" groupings (characteristic of formal operational
groupings and categories are generally made by the accumulation of one's past experiences
(Langer, 1989).

Klausmeier and Allen (1978) explain another important concept in this area. Taxonomic
relationships are those that are inclusive/exclusive in thinking (according to
their "natural" relationships)- i.e. those that classify things specifically including some
items and excluding all others. This form of thinking seems to increase greatly during
children's elementary school years and show a low increase during the junior and senior
high years (Klausmeier and Allen, 1978). This form of thinking, of seeing everything
apparently in only one way or category, seems to indicate an increase in premature
cognitive commitments and, therefore, an increase in mindlessness. This research suggests
that such increases are more prevalent in years marked by concrete thought than in years
where the onset of formal thought may occur.

Perhaps the best research I have encountered regarding conceptual (i.e. cognitive)
levels was done by Cross with junior and senior high boys (1966, as cited by McCandless,
1970). Cross broke conceptualization down into two levels: high and low. Those with a
high conceptual level (HCL) had more conceptual dimensions and were able to apply more
than one concept to a given stimulus (i.e. divergent thinking). When encountered with
new situations, they were more likely to explore the situation, "be creative," and adapt
well to the change. Contrastingly, those with what Cross called a low conceptual level
(LCL) opposed change in their environment and applied over-learned methods of evaluation and response, as if trying to adhere to rules.

Another variable affecting mindfulness is conditionality. Langer and Piper (1987) performed a fascinating study in which they presented stimuli to subjects under different conditions. They used the phrases "is" and "could be" in an effort to determine the consequences, if any, of using a conditional statement ("could be") in some circumstances, thinking that an object may then be seen in a different way. They found that subjects introduced to an object with the unconditional phrase (e.g. "This is a X.") had difficulty producing one creative use for the object, let alone two. Most subjects who received a stimulus introduced with the conditional phrase (e.g. "This could be a X.") were able to see the object conditionally and could produce at least two successive creative uses for the object. A third category was introduced to the object with "I don't know what it is, but it could be a X." Langer and Piper found that these subjects could produce one creative use for the object, but then fixated on it and could no longer be creative.

This conditional thinking, Langer (1989) suggests, can be used practically with children and adolescents when describing the make up of a family. She suggests that parents should teach their child(ren) that "a family could be a mother, father, and child(ren)," rather than "a family is a mother, father, and child(ren)." In the event of a divorce or separation in the family or in meeting other children from single family homes, the child or adolescent may have a better understanding of what a family can be.

Conditional teaching was tested by Langer and Joss (unpub. m.s., as cited by Langer, 1989). In this study, a number of Harvard and Stanford students were exposed to
material either conditionally or unconditionally and were then tested to determine how creatively each student could use the information. Langer and Joss found that those who received the information unconditionally were less able to use it in a creative way, again suggesting that conditional exposure to material in learning can aide students in its application.

Novelness of a given object has also been used as a variable in studying mindfulness. Research studies on exploratory drives have shown that a novel stimulus evokes an exploratory drive which motivates exploratory behavior (Montgomery, 1953, as cited by Fowler, 1965; Langer, Fiske, Taylor, and Chanowitz, 1976). People tend to investigate a novel stimulus to make the item less novel and thereby make their situation more predictable and "comfortable" (Langer et al., 1976). Thus, the exploratory behavior will subside once one becomes satiated to the stimulus. When faced with similar objects in other situations, this reduction in exploratory behavior will also occur, suggesting stimulus generalization (Montgomery, 1953, as cited by Fowler, 1965). However, if one is placed into an overlearned situation and is required to think about the situation, one tends to become less articulate in speech (Langer and Weinman, 1981). This author predicts that mindfulness will increase with increased exploratory behavior (a likely result of consideration of a novel situation), and will decrease when this behavior lessens (in familiar situations, most likely).

A major gap in the research on mindfulness that this author has found is the investigation of gender differences. Perhaps some generalizations can be made from the numerous studies done on creativity, as discussed later (e.g. Hayes, 1981; Laughlin,
Doherty, and Dunn, 1968, as cited by McCandless, 1970), but more research certainly is needed in regard to mindfulness.

Mindfulness and creativity seem intricately related, as creativity involves breaking through any present categories to create new ones - almost an exact duplicate of Langer's definition of mindfulness. Because of the relatively small amount of research that has been done on mindfulness/mindlessness, perhaps some conclusions can be drawn from the research that has been done on creativity.

Creativity

**Concept of Creativity.** Creativity, as defined by Frank Barron (1969), is the "ability to bring something new into existence." It can either be the creation of something totally original or the reshaping of given information, depending on one's specific definition. Regardless, creativity often appears when one is faced with some sort of challenge or difficulty. Torrance (1962) suggests a four-step process in the production of creative ideas in such instances. First, one senses the difficulty. Next, a hypothesis is made concerning a solution which then is tested and revised. Next, the hypothesis is retested, and finally, the results are communicated orally or in script.

John R. Hayes also defines creativity, but he uses three different measures: the originality and the value of the generated idea and the mental abilities of the thinker (1981). He doesn't believe that a thought can truly be considered creative if it has no benefit to mankind or if the originator came up with the idea "without thought." He is quick to add, however, that a creative idea can be unintentional or accidental, as was the case with the discovery of radioactivity. This definition will be further discussed later.
Weisberg, in his book *Creativity: Genius and Other Myths*, discusses several different ideas regarding the generation of creative ideas (1986). The "nothing new view," a behaviorist perspective, suggests that nothing is truly creative, because ideas or thoughts which are often considered "new" are simply slightly different thoughts from the past. This reinforces Barron's (1969) definition of creativity which requires that a creative thought be completely original to the individual thinker.

The "messenger of God view" states that creativity comes by leaps, without one realizing its origin (Weisberg, 1986). This leap of creativity flows from one's unconscious, some feel, in what is commonly termed an "aha experience." Behaviorists may argue, however, that the contents of one's unconscious are a collection of thoughts and experiences already experienced, thus restating the nothing new view.

A third, and perhaps more popular, view of the creative process involves "spontaneous restructuring" of past experience (Weisberg, 1986). Although this falls very close to the nothing new view, followers of this method of creativity suggest that experience is the basis for the initial approach to a problem. Then, one utilizes this knowledge, but "breaks through" it in order to solve a problem or simply to think in a novel way. This perspective, Weisberg suggests, implies that all people are capable of creative thinking, and that "creative genius" is non-existent.

Finally, the "cognitive processes" view (which was discussed at length earlier) can be used to account for creativity. When mindful or divergent thought is implemented, ideas can be produced which are both original and valuable in a way that demonstrates the mental abilities of the thinker (Hayes, 1981).
J. P. Guilford has generalized four traits which seem to be related to one's creative capacity (Weisberg, 1986). First, one's sensitivity to problems in a given area can be an asset or a hindrance in creative thinking. One is generally more able to pick up cues for action in a situation if one is particularly sensitive to its many aspects. Nonetheless, if one becomes emotionally attached to a situation and perhaps only supports one side, he or she may eliminate any sensitivity toward the other perspectives. Fluency is a second trait, one that involves being able to speak freely and/or produce ideas about a given topic. This is a very broad category, as it is affected primarily by the other three traits. Guilford's third trait is originality, which is often seen as the primary aspect of creativity. Barron gives what I feel is the best explanation of the importance of originality (1969). Creativity, he explains, involves the production of ideas that are novel to oneself, though not necessarily to mankind as a whole. In other words, creativity cannot rest on the uniqueness of an idea in comparison to others' ideas. Finally, flexibility of thought is a trait that is closely related to sensitivity but seems to involve more of one's own maturity in thought processes.

Guilford has also called this concept "divergent thinking" (1967, as cited by McCandless, 1970).

**Concept of Divergent Thinking.** Divergent thinking, according to Guilford, can be considered one aspect of creativity, and Hayes would consider it an implanted mental ability of the creative thinker. Breaking any preconceived categories or entering situations where none have been made can allow a mindful individual to view a person, item, or event in original ways. Langer (1989) gives an excellent example of divergent thinking. When each of us spends time with people, we assume certain similarities with them.
However, because we are all individuals, each of us differs in several respects from one another. When one of these differences is noticed, there is a tendency to look for more differences, and when these details are viewed mindlessly, they can predominate our perception of one another, reinforcing societal prejudices and personal mindsets (Langer, 1989). Such prejudices can be against races, the handicapped, or the opposite gender, and each of these has been present in America and elsewhere for centuries. Many people in the minorities and majorities alike are fighting to "stop the hate," a theory that seems theoretically sound, but how can society begin this process?

A study has suggested that having an outlet for mindful curiosity enhances future encounters with "atypical, novel" people (Langer, Fiske, Taylor, and Chanowitz, 1976). In other words, discrimination rather than prejudice should be our goal in dealing with minorities and even in education. Langer (1989) explains that being mindful includes a recognition of the fact that everyone deviates from the "norm" in some respects. In fact, all attributes (including skin color, gender, and physical and mental abilities) lie on a continuum. Discrimination (the ability to perceive difference) of skin color, for example, along this continuum and knowledge that "red, yellow, black, and white" are relative may lead some people to separate themselves from prejudice. Through mindful education and exposure, children and adults alike can be taught that skin color is "skin-specific" and not "person-specific." This can allow an individual to view people of other races divergently - i.e. seeing them without dependence on any preconceived categories. A study by Kutner and Gordon (1964, as cited by McCandless, 1970) showed that non-prejudice sixteen year olds scored higher in critical thinking than did prejudice sixteen year olds. This again
suggests a connection between discrimination (rather than prejudice) and divergent or critical thinking.

**Research on Creativity and Divergent Thinking.** Several studies have suggested that certain groups of people excel in their creativity. Ethnicity, age, and gender seem to be correlated with creativity levels.

Different ethnic groups have varying degrees of measured creativity. Jewish people tend to excel creatively (Hayes, 1981). Hayes attributes this to the focus that Jewish families have on children and on intellectual success in school. It seems, however, that non-Jews in America tend to overemphasize nonintellectual activities. Most people likely remember the perceived importance in high school of having a letterman's jacket, being president of the student council, or starring in the school play. Jews, on the other hand, quite consistently show greater respect for scholarship and academic study than non-Jews.

Asians also tend to have relatively high creativity levels (Hayes, 1981). They stress scholarly activities and careers in their young people and they tend to have particularly stable homes. While the Jews' emphasis on scholarship is based on strong religious and family beliefs, the Asians tend to view it more as a strong moral conviction. Historically, Asians' greatest goal was wisdom, and the Confucian method of achieving this is by studying (Hayes, 1981). This value is instilled in children by schools and particularly the family and is strongly revered by most members of the Asian culture. A notable quote is associated with such people: "Determine to succeed, study with all your might, never forgetting the shame of failure" (Dore, 1965, as cited by Hayes, 1981).
Two ethnic groups have shown lower levels of creativity - blacks and American Indians. One of the highly stereotypical, but often true reasons for lowered creativity and more concrete thinking in blacks is that they have an inadequate education in comparison with other ethnic groups, because they have suffered from discrimination and prejudice in schools. Also, they have felt a lack of opportunity and support, primarily from their families, which tend to be less stable than those of whites (Hayes, 1981; Manaster, 1977). American Indians have also been the "victim" of a predominantly white school system, as many children have dropped out of school, leaving them with fewer opportunities to expand their creativity (Hayes, 1981).

Some theories and studies suggest a correlation between age and creativity. Barron (1969) claims that as people pass from childhood to adulthood during adolescence, they are faced with a paradoxical choice between acceptance of discipline and freedom. The challenge with which each person is faced is avoiding the sacrifice of either of these to the other. We must develop a disciplined method in order to use one to gain the other - for example, we may "...take on habits in order to increase our flexibility..." (Barron, 1969). He fears that creativity can be lost in this effort toward a working balance of the two unless one actively combats this potential loss using discipline.

A more precise correlation is suggested in a study by Wertheimer, in which he states that adults may have undergone more "drilling" in their lifetimes than younger people (1959, as cited by Weisberg, 1986). Because this drilling may lead to premature cognitive commitments and mindlessness, adults may be more rigid and less creative than their younger counterparts.
One may question why adults are thought to have a lower creativity level, considering the suggestion earlier that formal operational thought (which may develop during later adolescence) allows more abstract, creative thought. A possible explanation is that most adults do not operate in formal operational thought, either by their own choice (because concrete operational thought is "easier") or because they have not attained the formal level of thinking (Santrock, 1992).

Hayes would not agree with the above conclusion that adults are less creative than children. He has adopted a view of creativity which includes cognitive processes which, he argues, are not fully present in children (Hayes, 1981). In Hayes' opinion, an act must meet three criteria before it can be called creative. First, the act must be original. "Creative" acts in children may be unique to the individual, but are rather stereotypical in children of approximately the same age. Secondly, the act must have a certain degree of value. Often times the acts of children may seem "cute" or "fun," but rarely does a child produce a thought or idea which is truly valuable. Finally, a creative act must show that its producer has special mental abilities. Certainly, Hayes adds, intentionality is not required, but the ability to create something and know its significance is vital. Such abilities are ordinarily not found in children.

Hayes (1981) cites the case which has been used to refute this point the best - Wolfgang Amadeus Mozart. Mozart was a musical child prodigy, who composed at age eight and performed numerous works as early as age four. In the minds of many critics, however, Mozart's work as a pre-teenager does not nearly equal his later work, either musically or in quantity. From a study examining recording frequencies of different
composers' works as a measure of each composer's worth in a given period, Hayes concluded that no one can compose truly outstanding music without at least ten years of intense musical experience.

The acts demonstrated by children that are often called "creative" by the lay public are not truly creative, according to Hayes' definition. However, these acts are sometimes indications of mindful and divergent thought processes in these young people - thus, Hayes' term "cognitive processes."

A number of studies have suggested that men tend to be more creative than women. Laughlin, Doherty, and Dunn (1968, as cited by McCandless, 1970) found that males tended to be higher in performance of both "intentional" (closely tied to intelligence) and "incidental" (closely tied to creativity) learning than did females in both high school and college aged samples. Another study (Fischer and Leder, 1961, as cited by Horrocks, 1969) reported that male teenagers tend to stereotype less than their female counterparts.

In prior discussion on prejudice, stereotyping was defined as a form of mindless, non-divergent thinking, and, therefore, one could deduce from this information that young males exercise greater mindfulness and divergent thinking than do young females. One should be careful in making such a generalization, however, even though no information regarding gender bias in these studies was found.

Hayes (1981) discusses these same gender differences in a more causal way. He claims that tremendous time must be spent in a field before creativity can develop. Several elements of our culture have given men more opportunity than women to develop creativity. Hayes states that "women's jobs," such as a nurse, teacher, or secretary,
traditionally have not fostered creativity as much as "men's jobs" have. Also, women's credentials have not been valued as much as equal credentials in men. He also reports a study by B. W. Hayes (1980, as cited by Hayes, 1981) that suggested greater ease in combining career and marriage in men than in women. For these reasons, Hayes feels that men have traditionally gained higher and more stable positions than women and have, therefore, a greater opportunity for creativity. Assuming this to be true, this tendency will likely change with the push toward women's equality in the 1980's and 1990's.

One very important concept which must be explored is the relationship, if any, between creativity and intelligence. Hayes (1981) claims that people who frequently think creatively tend to have a higher average intelligence quotient (IQ) than the standard population. Creativity generally requires a minimum IQ of 120, while the general population's mean is theoretically 100. An alternative explanation for this phenomenon is that society may prevent those with lower IQ's from entering schools or vocations which will enhance their creativity. Case and Collinson (1962, as cited by Manaster, 1977) and Lovell and Shields (1967, as cited by Manaster, 1977) found a positive correlation between IQ and onset of formal operational thought. Another author (McCandless, 1970) sees IQ and creativity as two different concepts and explains this difference between intelligence and level of thought processes as quantitative versus qualitative, respectively.

He may feel, therefore, that IQ tests are not as valid a test of creativity as are other problem solving tests. Brown and Langer (1990) would probably agree with him. They state that a mindful perspective can be used when one is not feeling smart, because then he/she is simply "...being sensible from some other perspective." In other words, a
mindful (rather than an intelligent) style of thought appears to be qualitatively more useful and helpful in dealing with incoming information on a daily basis.

Much in one’s environment (e.g. parents and peers), interests, and education appears to affect one’s cognition and conceptualization. In Cross's study discussed earlier, the parents of those in the HCL group were described as less authoritarian, the mothers especially, than the parents of the LCL group. Additionally, the HCL boys' parents had more interdependence between themselves than those in the LCL group. The lack of authoritarianism and presence of a "balanced family structure" perhaps was related to the boys' high level of conceptualization. Those with a lower level were possibly told what was right and wrong by their parents, initiating a life-long style of thinking and relating that involved the assignment of categories.

The conceptualization level and/or creativity level in parents, then, appears to be an issue in predicting correlationally these levels in their children (Obukhova and Churbanova, 1992). A Getzels and Jackson study (no date given, as cited by Langer, 1989) found that a high intelligence quotient in parents is correlated with the presence of rigid mindsets. Nonetheless, high creativity and "emotionality" and "balance" in parents were correlated. Certainly, none of these characteristics can be viewed as causal predictors, but this research presents some interesting insight into American families and children.

Peer influence is another element potentially related to cognition and conceptualization (Obukhova and Churbanova, 1992). Torrance states that strong peer influence limits creativity (1962). One's view of anything essentially depends on two
elements: experience and context. If one has not experienced something before (i.e., if it is novel), one is forced to rely on the context of that initial experience. When an adolescent boy is with his friends, for example, he may be more likely to view a melancholy movie in a more satirical, condescending way than when he is with his parents. He also may view the "good and the bad" of smoking in different settings, as suggested by Langer (1989).

A third potential environmental influence is one's interests or activities. Langer (1989) suggests that work very often becomes mindless, as similar tasks and situations are repeated throughout one's job. Play, however, almost always remains mindful, because taking risks in play is safe and fun, so people generally allow themselves to venture into the unknown more often. Generally, one may assume that a greater proportion of adults are employed than adolescents, so one might then conclude that the "play" among adolescents encourages mindfulness, while the work among adults encourages mindlessness. Nonetheless, Eisenberg (1965) is quick to point out that creativity can only be increased in adolescents with "individualization" in their education and vocations. In this way, feelings of inferiority may be avoided, allowing greater longevity on a given task.

A very important facet in most American adolescents' lives is education. Henry Adams defines education as "...the integration of fundamental and primary experiences in the development of the self" (Barron, 1969). Langer (1989) and McCandless (1970) both agree that the goal of our present educational system is not consistent with Adams' goal above. Instead, they feel it is becoming a goal-directed (rather than process-directed) system. At a time when it seems most advantageous to foster creative and divergent
thinking, teachers often restrict spontaneous, free behavior and thought (McCandless, 1970). Rules are stressed, and children and adolescents are limited in what they can do cognitively and socially. In these classroom situations, the young people do not relate the new information they are receiving from the teacher to similar information from their past. Instead, they simply take it in mindlessly without asking any questions or integrating it into their "knowledge storehouse." An unfortunate and evident consequence of this mindlessness is "...less complete understanding, learning, and memory than would occur if people mindfully analyzed new information with respect to what they already know" (Pressley et al., 1992).

Montessori and Piaget shared perspectives on the importance of intrinsic motivation in children's education (Ault, 1977). In Montessori schools, teachers encourage intrinsic motivation by allowing the children to repeat and imitate behaviors and thought patterns rather than simply "teaching" these concepts to the children. Also, individual learning is primarily used, as studies have suggested that it is most effective (Ault, 1977, Dunnette, Campbell, and Jastaad, 1963, as cited by Weisberg, 1986). Creative teaching methods, like Montessori's, assume that the difficulty in the fostering of creativity and mindfulness is with the initial generation of ideas. Therefore, they encourage two primary methods of thinking: freeform, associative thinking is essentially divergent thinking, and standard, logical thinking allows children and adolescents to evaluate their and others' ideas (Weisberg, 1986). These methods of thinking can cultivate mindfulness in children and adolescents.
This research on mindfulness and divergent thinking is important. Understanding any differences in the variables I am including in my experiment will allow us to make conclusions regarding the theoretically best focus and the effectiveness of our family systems and education. By probing deeper into the mind of the adolescent and the adult, we can also more fully understand the developmental changes that occur in the thought processes of today's young adults.

**Methods**

**Subjects**

Seventy-two adolescent subjects of an equal gender proportion were recruited from English classes at Saint John's Preparatory School, a private Catholic high school in rural Minnesota. Seventy-two adult subjects, also of an equal gender proportion, were recruited from Introduction to Psychology labs at Saint John's University and the College of Saint Benedict, two private Catholic colleges, also in rural Minnesota. Six males and six females were assigned to each experimental group. All subjects were tested individually. The adolescent (i.e. high school) subjects ranged in age from 14-18 with a mean age of 16.19. The adult (i.e. college) subjects ranged in age from 18-24 with a mean age of 19.32. The overall mean age was 17.76.

**Apparatus**

Two experimental stimuli were used. The "familiar" object was an ordinary, shiny metal nutcracker. The "novel" object was a nutcracker that was handmade out of wood and operated by a twisting motion of a wooden screw exerting pressure on the side of the nut.
Procedure

Approval was sought and granted from a university human subjects ethics committee. Subjects were randomly assigned into the groups described below. Each subject was led into the experimental room by the male researcher and was asked to give informed consent. After signing this form, he/she was given one of the two objects. Each subject was presented with the object in one of three ways: (1) "I have here what is a nutcracker" (unconditional) - (2) "I have here what could be a nutcracker." (conditional) - (3) "I have here an object." (no introduction). The subject was then told he/she had five minutes to create a list of possible uses for the object, "as creative or as normal" as he/she wanted to make them. Each subject recorded his/her ideas on a coded data sheet (see Appendix 1). Following the five minute period, the subject was asked to describe any of his/her uses that the experimenter did not understand fully. The subject was then debriefed, as he/she was given a full description of the experiment. Finally, the researcher encouraged the subject to state any questions or comments that he/she had about the study.

One dependent variable was the number of responses given by a subject. Once the responses of all subjects were collected, the experimenter developed nine categories which included all of the responses. All responses were then categorized into one of nine categories (as described in Appendix 2) by the experimenter. This categorization process was duplicated by the experimenter's faculty advisor, and modifications of the categories were made until an acceptable inter-rater reliability was produced by using percent
agreement between the two raters. The number of categories that a subject's responses filled (i.e. into which at least one response fell) was the second dependent variable.

**Results**

The results did not confirm any of my hypotheses. A 3 X 2 analysis of variance (ANOVA) was performed to determine any significant effect that the relationships among the independent variables had on the number of responses produced. The results showed no statistically significant main effects or interaction effects of the .05 level. The mean number of responses was 10.84 (s 4.33); the means for each cell can be found in Tables 1-6. The F-scores for each variable are in Table 7. A t-test was run to determine any gender differences in response level, and this also showed no statistical significance, t (142) = .29, p > .05.

A second 3 X 2 ANOVA was calculated to determine any effect the independent variables had on the number of categories filled. This test also showed no significant results in regard to main or interaction effects (p > .05). The mean number of categories filled was 5.28 (s 1.50), and the cell means can also be found in Tables 1-6. The F-scores for each variable are in Table 7. No statistically significance was found in a t-test run to determine any gender differences in number of categories filled, t (142) = .28, p > .05. The accuracy of response placement into categories had an inter-rater reliability of r = 88.5%.
### Table 1

**Independent Variable = Conditionality**

<table>
<thead>
<tr>
<th></th>
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<th>Dependent Variable = Number of Categories Filled</th>
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<tr>
<td></td>
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<tr>
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### Table 2

**Independent Variable = Novelness**

<table>
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<tr>
<td>Novel</td>
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<td>Familiar</td>
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### Table 3

**Independent Variable = Age Group**

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<tr>
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</tr>
<tr>
<td>Adults</td>
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<td>3.98</td>
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### Table 4

**Independent Variables = Conditionality, Novelness**

<table>
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<tr>
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<td>Conditional / Familiar</td>
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<td>No Introduction / Familiar</td>
<td>11.25</td>
<td>3.73</td>
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### Table 5

**Independent Variables = Conditionality, Age Group**

<table>
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<tr>
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### Table 6

**Independent Variables = Novelness, Age Group**

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<tr>
<td></td>
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Table 7

F-scores and p-values of the Main and Interaction Effects

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<td>p-value</td>
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<td>.525</td>
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<td>.954</td>
<td>.887</td>
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<td>.477</td>
<td>.508</td>
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<td>1.639</td>
<td>.198</td>
<td>2.085</td>
<td>.128</td>
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Discussion

This author predicted that the level of each dependent variable would be higher for those in the following categories: adolescents (because of the smaller amount of time they have had to form habits and premature cognitive commitments); novel stimulus (because there is a smaller likelihood of functional fixedness); conditional presentation (because there is a greater likelihood of conditional thinking); and males (because prior research done on creativity suggests this). None of these hypotheses were confirmed by this experiment.

No pattern emerged in the results that would suggest that a significant effect was being made on either dependent variable by any independent variable. Nonetheless, it seems odd that these same variables would have demonstrated significant influence on similar dependent variables in prior studies, including Langer’s work. However, a closer look may explain these variations.

One explanation for the nonsignificant results in this study is that the variations made in the different conditions were not robust enough to influence the dependent variables - i.e., the null hypothesis is accurate. Perhaps, the presence or lack of conditionality, the novelness of the stimulus, the respective age of the subject, and the subject's gender have little or no effect on their mindfulness or divergent thinking. It appears that the only published studies on mindfulness and divergent thinking are those that have shown statistically significant results. If the null hypothesis is accurate in this study, it is possible that a number of other unpublished studies have shown nonsignificant results. This would directly contradict the work of Langer and others.
Certainly, the operational definitions of the independent variables in this study differed from those in Langer's and the others' work. A second explanation of the nonsignificant results is that the operational definitions in this study were insufficiently concise, causing no clear distinctions between categories and, thus, no significant differences. Let us focus individually on the independent variables.

As suggested in the introduction, a developmental investigation measuring specifically mindfulness and divergent thinking in the adolescent and adult age groups has not been published to this author's knowledge. Therefore, such a study is important because of its implications on the educational focus in high school and college. This study utilized adolescents and adults with a difference in mean ages of only 3.13 years. Perhaps, the sampling of college students as "adults" is inappropriate and inaccurate because of their closeness in age with the adolescents. Whether or not a sample of older adults would have differed from adolescents in their level of mindfulness and divergent thinking is unknown, but a sample of people in their thirties or forties would likely have shown characteristics of thought more typical of adults, and, thus, would have been a better sampling population than college students.

One must also consider the novelness of the stimuli. For this population of relatively young people, the stimulus labeled "novel" was most likely unknown as it is no longer used in everyday life. Such a nutcracking tool was probably more common in the early to mid twentieth century.

The familiarity of the other object, however, could be called into question. From this researcher's myopic standpoint, a great majority of Americans have a familiar
nutcracker and a bowl of nuts in their home, especially around the Christmas holiday season. Those with whom I discussed the experiment prior to its execution agreed that the shiny, metallic nutcracker would be an item familiar enough to most people that it would be a good selection for a "familiar" stimulus in the experiment. However, in a more recent discussion with Dr. Anthony Sorem, a social psychologist, I discovered that perhaps the traditionalistic aspects of the Christmas season are decreasing and so is the commonness of the "familiar" nutcracker. In fact, Dr. Sorem speculated that many young people have not seen and most have not handled a nutcracker. Therefore, when a subject was given either the "novel" or "familiar" stimulus, he/she likely viewed and handled it as a novel stimulus. One subject notably responded with surprise when she was handed the "familiar" stimulus, and she voiced a lack of understanding the intended use for it. Perhaps, the similarity in novelty of the two stimuli influenced the levels of the dependent variables. The use of a very common object (e.g. screwdriver, pliers, rubber eraser) as the "familiar" stimulus may have produced results more indicative of any differences in the effects of novelty on mindfulness and divergent thinking.

The conditionality with which each stimulus was presented to the subjects is another concern. The exact presentation of the object was identical in each case: I brought the stimulus into the subject's view and immediately made the conditionality statement. In other words, the conditionality statement was made at the same time the subject was perceiving and studying the stimulus which, as suggested above, was novel to the subject. As a result, the subject may not have consciously processed the conditionality information, preventing accurate measurement of this variable. A better manipulation,
perhaps, would involve a printed conditionality statement as part of an instructions card. All of the subject's attention would have been brought to the instructions if he/she was required to read them. Also, the subject could then refer back to the card during the testing period, enforcing again the conditionality statement.

Gender differences may not be present in mindfulness or divergent thinking, per se, though they do appear to be present in the broader category of creativity (e.g. Hayes, 1981; Laughlin, Doherty, and Dunn, 1968, as cited by McCandless, 1970). Obviously, the researcher could not randomly place people into the "male" and "female" groups, so there is no reason to question the methodology used in attaining the nonsignificant results of the t-tests investigating gender differences in the dependent variables.

Those who plan to study this area further should consider creating more precise operational definitions prior to experimentation. Further study in this field certainly should be pursued because of its implications on parenting styles, educational practices, and peer relationships. Weisberg (1986) suggests three specific reasons that can be used to explain why the differentiation of variables affecting mindfulness and creative thinking is so important.

First, if the personal characteristics and surrounding circumstances of adolescent and adult creative achievement could be isolated, measurement of these traits in children could determine those who have the precursors of what may result in creative or divergent thinking. These children, then, could be placed in special programs that stimulate the children's abilities.
Secondly, those who do not show such potential could be educated in ways that promote and foster creativity - perhaps, through conditional and novel presentations of material. This could be done at the college level by incorporating lecture and inter-student discussion. A lecture delivered by a creative professor can provide students with factual information in very novel ways. However, reality is that many college lectures are dry and very predictable. Incorporation of student discussion in these classes can allow students to present novel views on subject matter to one another, potentially resulting in conditional thoughts and attitudes concerning the class material.

The third and potentially most important application is in child-rearing. If the personal characteristics of creative individuals could be isolated, parenting styles could be taught that would maximize the probabilities of the appearance of these traits of creativity in children and young adults. Disciplinary policies, for example, could be a result of discussion between the parent and child, thus allowing each to see the viewpoints of the other. This may reduce confusion in the child about consequences that were perceived to be inconsistent. Additionally, the parent could gain a better understanding of the child's motives and attitudes.

Whether or not the isolation of the traits of mindful and creative individuals is possible, it is definitely worth considering. Although Weisberg suggests that the benefits of isolating these traits are many, one must realize that doing so will not immediately solve the major crises affecting the world today. Our educational system will continue to suffer as students allow information to pass through them without actually processing it and giving meaning to it. Teenage suicides will continue, because adolescents sometimes see
no alternatives other than death as a solution to their current depression. Divergent thought is apparently very difficult for people in such a depressed state. Racial hatred will continue as a result of mental sets and premature cognitive commitments held by members of both the ingroup and the outgroup. What then can be gained from a study of cognitive psychology?

Further investigation into this field will give us new insights into the development of attitudes, thoughts, and behaviors that affect all humans. An understanding of our intrapersonal thoughts and interpersonal interactions is the key to unlocking the mystery of the human mind. This knowledge allows us to peer beyond the familiar, recognized opinions we hold about ourselves and others and gives us the opportunity to face life in novel ways. Opening these doors within ourselves gives us the occasion and ability to foster mindful and divergent thought in future generations.
References


<table>
<thead>
<tr>
<th>AGE</th>
<th>F / M</th>
<th>U / C / N</th>
<th>N / F</th>
<th>C / HS</th>
</tr>
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</table>

Appendix 1
Appendix 2

Categories Into Which Responses Fell

1. **Nutcracker** - The familiar use of each item.

2. **Pain Inflictor** - This may include poking, jabbing, hitting, or any other kind of weapon used toward another person. Also, any forms of torture are included.

3. **Crusher** - This includes any forms of crushing, not including a nutcracker.

4. **A Product** - This includes either of two types of responses:
   a. An object to give or sell to someone.
   b. A metal or wood object to be used for whatever metal or wood is used for (such as burning, melting down, et cetera).

5. **Grip** - This includes any form of clamping, gripping, squeezing, et cetera.

6. **Decoration** - This includes any form of clothing accessory, knick knack, art piece, decoration, or symbols (e.g. the letter "v").

7. **Toy** - This includes a toy for a child, a hand toy to pass time or make sounds or music, et cetera. This also includes any statements relating to usability for small people or small animals.

8. **Tool** - This includes any form of tool (to aide human abilities) other than a gripping device. This may include something with which one may reach, scratch, file, exercise, measure, pound, contain, eat, drink, smoke, write, strain, stir, et cetera.

9. **Miscellaneous** - This may include any uses that do not fit into any of the above categories.
Additional Readings


