Socioeconomic status and domains of creativity: Is the artist really starving?

Michelle Louise Evans
SOCIOECONOMIC STATUS AND DOMAINS OF CREATIVITY:

IS THE ARTIST REALLY STARVING?

A Thesis
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Michelle Louise Evans
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ABSTRACT

Socioeconomic status (SES) influences many aspects of a person's life, and stereotypes concerning level of SES and the domain of creativity exist. It was hypothesized that children classified as low SES would perform more creatively in the visual arts and language arts domains of creativity than in the mathematic and scientific domains. In addition, children classified as high SES would perform in the opposite manner. The second hypothesis tested whether female children would perform more creatively in the language arts domain rather than in the math domain. In addition, male children are predicted to perform better in the math domain than in the language arts domain. There was a significant difference between the domains of creativity. There were no significant differences between SES and domain of creativity. There were also no significant differences between gender and the domains of creativity. These results were in line with the literature on domain specificity. There were significant positive correlations between SES and science and SES and visual arts. Possible explanations for these correlations include resources necessary to achieve a basic knowledge of domain relevant skills.
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Figure 1. Means for Each Domain of Creativity: Language Arts, Visual Arts, Mathematics, and Science ........................................ 61
A scruffy man stood in front of a large canvas in a studio littered with old paintings and brushes caked with paint. The room was bright but slovenly; this man sacrificed all earthly comforts for his art. Across town a well manicured man was seated in a big leather chair. He was conversing with a colleague twenty thousand miles away about his ideas on theoretical physics.

The “starving artist” is a concept that most people can quickly grasp — a passionate person of undiscovered talent trying to make his or her way in the world. To survive they commonly take on odd jobs to make ends meet. Many movies and theater shows featured starving artists such as La Bohème, Rent, and Moulin Rouge. Many generations have been entertained by starving artists and are well aware of the stereotype.

A less well-known stereotype is the “affluent intellectual.” Seemingly the opposite of the starving artist, this person cares deeply about their work and status in the community. Examples of the affluent intellectual could be an eminent scientist or mathematician. This person is as creative as the starving
artist, but the palettes are data and the brushes are theories. These are two seemingly opposite stereotypes of creative genius.

While most people in this world fit neither of these stereotypes, some people fall closer to one stereotype than the other. Why is that? How does the level of affluence experienced as a child influence the way the creative spirit expresses itself? Does growing up in poverty lead to increased artistic creativity and thus a proclivity to be the starving artist? Socioeconomic status (SES) is believed to influence many aspects of a person's life, and anecdotal stereotypes have shown a disparity between level of SES and the domains of creativity. The purpose of this research is to quantify this phenomenon. First, a description of the domains of creativity and research on domain specificity will be reviewed. Second, SES and its effect on creativity will be explored. Last a review of how gender and development influence creative expression will be undertaken.

Domains of Creativity

Creativity is defined as bringing into being something that is original and also appropriately useful (Sternberg & Lubart, 1999). Creativity is something that
is important to research because it is a significant aspect of an individual. Many professional fields consider it to be tantamount to job performance and career achievement (Cooper, Clasen, Silva-Jalonen, & Butler, 1999; Elkins & Keller, 2003; Mumford, Connelly, Scott, Espejo, Sohl, Hunter, & Bedell, 2005; Rostan, 1997).

A domain is an area of work or study that is subject to the same set of rules. Thus, an example of a domain could be visual arts, language arts, science, or math. Creativity can not exist in a vacuum. It must be created from an already existing method, notation, or body of information. Therefore, to be creative within a domain means that one is bringing something new and valuable to a field using the accepted methods of that domain.

First, a review of the requirements for the visual arts domain will be undertaken. Artistic creativity requires mastery of the knowledge and skills related to the discipline of visual arts and application of this knowledge to problems in the discipline. Martindale (1989; 1990) proposed a model of artistic creativity based around the concept of novelty, usefulness, and the precarious balance between the two. Artists are always trying to express deep seated emotions through their work. However, they must continue to come up with new methods of
expressing their feelings. With every new advancement in art it becomes harder and harder to find new artistic methods that have not been previously used, but that still remain in the art domain. Artists require knowledge such as how to reflect on their emotions and translate that to the desired medium. They must also contend with the problem of finding novel, but still functional methods to do so.

Language arts creativity requires mastery of the knowledge and skills related to the discipline of writing and the application of this knowledge to problems in the language arts discipline. Writers must have knowledge such as having high verbal ability, and an active imagination (Kohányi, 2005). Also, they deal with problems such as taming their mental instability and impulsivity (Kaufman, 2002). They also must know how to deal with writer’s block (Leader, 1991).

Creativity can be stereotyped into only the fine arts area (Smith, 1966). However, it is important to realize that creativity can be extended even into the highly technical domains such as science. Scientific creativity is the pursuit of understanding natural phenomenon. Scientific creativity requires mastery of the knowledge and skills related to the discipline and applying this
knowledge to problems in the discipline. This knowledge covers topics such as how to disprove hypotheses, apply known scientific theory to current problems, and use analogies to show how similar studies are related. A common problem experienced by scientists is dealing with unexpected findings. When scientists come across unexpected findings they would rather link a series of analogies together than rewrite scientific theory (Dunbar, 1995). These are just a few of the skills that scientists use when being creative in their domain.

Mathematical creativity requires mastery of the knowledge and skills related to the discipline of mathematics and applying this knowledge to problems in the mathematical discipline. Domain relevant knowledge covers areas such as factual knowledge, conceptual knowledge, strategic knowledge, procedural knowledge, and mathematical problem solving (Mayer, 2006). Factual knowledge is the ability to understand relational statements such as “two less than.” Conceptual knowledge is knowledge of problem types such as how to compute distance problems (time x rate). Strategic knowledge is the ability to work completely through a problem. Procedural knowledge is knowledge about which operation to do first, such as parentheses before exponents.
Mathematical problem solving is the ability to see mathematics as a practical tool for solving problems. Problems that are common in the domain could include anything from calculating how much weight a bridge could hold to finding an algorithm that would explain a pattern in a data set.

Most creativity experts believe that different domain dominance exists in every person. Using a series of five studies, Baer (1993) debunked the basic tenets underlying the theory that creativity is generalized. However, simply discrediting one theory does not lend credibility to alternative theories. Thus, in 1998, Baer reviewed the literature on domains and found that people who are creative in one domain are not necessarily creative in another domain. Additionally, children who are artistically creativity are not necessarily believed to be generally creativity (Runco, 1989). One example of this is Dow and Mayer (2004), who found evidence for the independence of verbal and spatial domain creativity. By teaching participants spatial skills they increased their ability to perform on spatial skill problems, but not on verbal problems. The learning that was specific to one domain did not transfer to the other domains being tested.
Baer (1996) found similar results within the language arts domain. When children were taught poetry-relevant divergent-thinking skills their level of creativity increased in poetry. When the same children were tested for increased creativity in short story writing, there were no significant increases. Creativity in different domains was not significantly correlated to one another (Baer, 1991). Additionally, domain specific skills remain stable over time (Baer, 1994). Children who were repeatedly tested in different domains were found to keep their level of creativity in that domain over time.

In any domain there is a certain expertise required to do well in that domain. Certain individual characteristics enable one person to do well in a certain domain rather than a different domain. For example, Feist's (1998) meta-analysis found that artists are less cautious, conscientious, and controlled than non-artists. Artists are more aesthetic, sensitive, and original. Scientists are more conscientious, fastidious, and self controlled than non-scientists. They were also more conventional, rigid, introverted, and dependent.

The requirements for entering a domain professionally are unique to each domain. Csikszentmihalyi (1996) stated that individuals should understand the rules that
accompany their domain. Entering the mathematics domain requires talent for mathematical modeling and the exposure to interesting mathematics and mentors. Historically, only individuals with high SES could obtain the level of education and networking needed to enter this mathematical domain. Most scientists have a creative peak before age 30 (Simonton, 1994).

In the arts, however, this age requirement is pushed back. Simonton (1997) has shown that careers in the arts tend to peak in the 30’s and 40’s, with a sharp drop-off in the 50’s. The arts domain has a different set of rules that does not require the amount of education that the sciences do. According to Simonton (1997) there are also differences within the same domain. For example, in the language arts domain poetry requires faster rates of ideation and elaboration than novel writing does. It’s the same domain, but they require different cognitive skills. This partially explains why different creative professions have different peak ages of creativity. Some peak productive ages for different domains of creativity are: poets, 20.1; mathematicians, 26.5; novelists, 27.1; geologists, 34.8; and historians, 38.5 (Simonton, 1988).

No matter what age a novice starts at it is believed to take ten years to master the domain (Simon & Chase,
Several case studies of chess players revealed that it took ten years to become chess masters. This phenomenon has been found in many fields. To extend these results to other fields, Hayes (1989) investigated the amount of time it took to become a master in several fields. Through the study of famous biographies, he found that composers, painters, and poets took on average 10 years to develop the skills to perform at the top of their game. Becoming an expert in a domain is further enhancing domain dominance creativity through 10 years of time and practice.

Socioeconomic Status

Socioeconomic status may be defined in many ways. For this paper the two main components of socioeconomic status (SES) are income and parents' education levels. The Annual Update of the Health and Human Services Poverty Guidelines (2006) cited that the income level of poverty for a family of four is $20,000 per year. People with low SES are more likely to develop a substance abuse problem (Fothergill & Ensminger, 2006) or health problems (Borrell, Beck, & Heiss, 2006). They are also less likely to have access to a store that contains fresh, healthy food (Moore & Diez Roux, 2006). These are daily problems that influence how
people with low SES lead their lives. It makes sense that people who have low SES would have a hard time pursuing education and creativity, when they may be struggling to meet their basic needs.

**Stereotype Threat**

An additional repercussion of having a low SES is the stereotype. Poverty is frequently viewed as a result of individual characteristics (laziness, lack of intelligence, lack of ambition) rather than societal factors (Lott, 2002; Rank, 2004). Woods, Kurtz-Costes, and Rowley (2005) found that poor people are viewed as less competent, especially in academics. In general, people classified as low SES are stereotyped as interpersonally oriented, whereas people from high SES backgrounds are thought of as intrapersonal and achievement oriented (Jost, Kivetz, Rubini, Guermandi, & Mosso, 2005).

When a stereotype negatively affects a stereotyped individual’s test performance, stereotype threat occurs (Marx & Staple, 2006). For example, if people do not believe low SES children can succeed in school, then it can affect the type of education they receive (Steele, 1997). This is in direct opposition to the high SES stereotype. Skafte (1988) found that wealthy individuals
were rated as more intelligent, did better in school, and made friends more easily than poor individuals.

Croizet and Claire (1998) found that the stereotype threat can exert serious damage to a student’s chances to succeed in school. Students were presented with a test and were asked to classify their SES. Half the students thought that the test was a verbal intelligence test, while the other half were told it was a difficult test. Students classified as low SES who thought the test was an intelligence test performed poorly. Students classified as low SES who thought the test was simply a difficult test performed the same as their high SES counterparts.

Similarly, Croizet, Després, Gauzins, Huguet, Leyens, & Méot (2004), found the same results using a different “intelligence” test. Additionally, they found that when the test was presented as an intelligence test, physiological measures of the low SES participants showed an increased mental load which interfered with their performance. This indicates that people are not just psychologically affected by the stereotype threat; they are physically affected by it.

Resources

The first component of this stereotype possibly stems from the amount of resources and time that are associated
with a certain SES. People from low SES backgrounds grow up with fewer resources than people from high SES backgrounds. These resources can result in differences in children’s schooling experience and cognitive development (Entwisle, 2005). High SES families can pay for preschool or summer educational activities, which can give their children a cognitive and educational boost. They also have the time to take their children on more trips in the summer, visit cultural events, take books out of the library more often, and have more school related resources in the home (Alexander, 2001). Having more time and resources available to a child can help steer a child’s interests in a certain direction. If a child has exposure to science museums or space camp, then he or she is more likely to develop an interest in that topic than a child who has never been exposed to such subjects (Leibham, 2006).

There are educational opportunities that are influenced by SES. Affluent parents can afford to live in neighborhoods with good public schools and can afford private schools that may be ranked higher than the local public schools. Affluent parents are more likely to have a college degree, thereby making their child a legacy to that university (Espenshade, Chung, & Walling, 2004).
To be creative in the sciences often requires deep financial backing through an institution or grant (Culross, 2004); something that most low SES people may not have access to. To get such backing would require a graduate level degree and demonstration of research potential. Historically, only people from high SES households had the opportunity to go to college and accomplish such things. Raskin’s (1936) study of gifted men found that most came from the upper echelons of society and that of these men, 73% of scientists received university training. Environmental factors such as family and school opportunities and experiences were important to achieving eminence (Davis, 1998). One of the environmental factors relating to creativity is the opportunity to find a mentor. Finding a great mentor is important because it can help a person use their creativity to its fullest. For example, 50% of all Nobel laureates studied under a Nobel laureate recipient (Simonton, 1994).

Social Rules

The second part of this stereotype is the knowledge about how to act appropriately in high SES situations. High SES parents know which activities will help their children grow cognitively and socially. This can help them fulfill their status requirements by being involved in the
“right” activities. Children learn what is expected of them to fulfill their place in society. High SES status children may be more likely to be prepped for college or a certain high paying degree. In fact all levels of society have “hidden rules” to operate properly within a social class (Payne, 1996).

To change social classes one would have to learn the new “hidden rules” in order to comply with their new social class. For example, low SES people typically focus their resources on survival, relationships, and entertainment. Payne (1996) found that low SES people are considered to be the most important possession in life and there is little incentive to building wealth. In contrast, high SES people typically focus their resources on status achievement. This can include education, work, politics, and social connections. Following these rules a person with low SES would be more likely to spend money on food for a family party, whereas a high SES would be more likely to buy a house. With all these advantages and knowledge about social rules, it is easy to extrapolate how high SES children would be more likely to finish high school and go on to college.

This phenomenon is similar to a concept called practical intelligence (Sternberg & Hedlund, 2002). It is
the ability to find one’s place in the world by adapting to or changing the surrounding environment. It is what most people consider to be “common sense” or having “street smarts.” If a person knows how to accomplish their goals in a socially acceptable way, then they are more likely to attain that goal. Being creative in a domain that is in line with the “hidden rules” of the social class or using one’s own practical intelligence may increase the likelihood that that individual will be more creative.

Impact on Creativity

Whereas the repercussions of having a particular SES are apparent, it is less clear how SES impacts creativity. Galton (1892) was the first person to investigate the role of heredity in eminence, trying to find evidence that people who were successful grew up in successful families. Galton was developing an argument for eugenics, which is dismissed by nearly all modern scientists. Greenberg, Shore, and Davidson (1972) found that white middle class children performed more creatively and had higher academic achievement than lower class black children. However, this research assumed that creativity was correlated with academic achievement and used methods that only assessed one aspect of creativity. In contrast, Bhardwaj and Gupta
(1980) found a curvilinear relationship between socioeconomic status and creativity which influenced whether a child had an interest in scientific pursuits.

Current theories focus more on the individual and environmental influence on children’s success. Simonton (1994) found that environmental influences were connected to a child’s later success. Specifically education and opportunities to find a mentor all contributed greatly to eminence.

High Socioeconomic Status Correlates with Achievement

One particular way that SES may influence creativity is through achievement. In *Freakonomics*, Levitt and Dubner (2006) use economic theory to demonstrate of all the things that parents do to help their children succeed in school the things that really matter are the things they can’t control. For example, parental education, educational resources at home, and maternal age were factors that correlated to a child’s later success in school. Children from higher SES families tend to perform better than children from SES families (Blau, 1999; Duncan & Brooks-Gunn, 2000; Magnuson, & Duncan, 2006; McLoyd, 1998; Ramey, & Ramey, 1998). This correlation was so robust; studies found that it mattered much more than
race. Battle and Pastrana (2007) found that once SES was controlled for, Hispanic and White 12th graders were found to have no achievement differences. However, if SES was not controlled for, the achievement differences between Hispanic and White students were apparent. In this study, they found that socioeconomic status was 10 times more powerful than race in predicting academic achievement.

Gender

When looking at domain research, gender cannot be ignored. Many studies have looked at gender and achievement. In a sample of all American children, the National Center for Education Statistics (2006) found that males outperformed females on standardized math tests. The same differences in performance were found on standardized testing (Casey, Nuttall, & Pezaris, 1997; Casey, Nuttall, Pezaris, & Benbow, 1995). Some studies have looked at mediating factors of this relationship (Baloglu & Kocak, 2006) such as higher math anxiety in females. Additionally, small gender effects have been studied and shown to exist, but in different areas of study (Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Kaufman & Baer, 2002; McClendon & Wigfield, 1998).
Creativity and Development

There have been many theories of creativity that correspond to development. Research has shown that personality can effect the development of creativity (Amabile & Hennessey, 1992; Ruscio, Whitney, & Amabile, 1998; Russ, 2003; Ryhammar & Smith, 1999). Research has also shown that too much schooling can hamper the development of creativity (Simonton, 1984; Weisberg, 1995). Creativity has been hypothesized as a U-shaped function, increasing in the early years and declining in the later (Gardner, 1980; Simonton, 1976; 1984). Other research has hypothesized it as ever-changing, with increases and decreases in creativity (Claxton, Pannells, & Rhoads, 2005). Focusing in on childhood, some research supports the idea of a fourth grade slump in creativity (Torrance, 1968); while other research directly opposes this idea with a surge of creativity in the fourth grade (Charles & Runco, 2001; Smith & Carlsson, 1983; 1985).

Research Questions

Children from low SES may not have been exposed to quantum mechanics, but most likely they have had a pencil to write stories or a crayon to draw pictures. Therefore, some domains may be more accessible to people from a lower
SES. This makes intuitive sense; people use whatever materials they have around them. For instance, if a child’s only toy was a crayon, the child would probably draw creatively. They mastered what their environment supplied them with. Many studies have looked at children’s creativity, yet no known research has looked at the impact SES has on domain of creativity.

There are two main research questions that this proposal will investigate. The first hypothesis is that there will be a difference between SES categories and domains of creativity. Children that are classified as low SES will perform more creatively in the visual arts and language arts domains of creativity than in the mathematic and scientific domains. In addition, children classified as high SES will perform more creatively in the mathematic and scientific domains rather than in the visual arts and language arts domains.

The second hypothesis concerns a difference between gender and domains of creativity. Female children will perform more creatively in the language arts domain rather than in the math domain. Additionally, male children will perform more creatively in the math domain rather than the language arts domain.
CHAPTER TWO

METHODS

Participants

There were 47 fourth grade students volunteering with parent consent from three public school classrooms at Hurley Elementary School in Visalia, CA. The average age was 9.5 years old with a range of 9-11 years old. Thirty-five percent of the participants were male and 65% were female. Of the races that were represented, 35% were white European American, 35% were Hispanic, 19% were multi-racial or of a not listed race, 9% were Asian American, and 2% were American Indians. The average household had an income of $70,000-$90,000 dollars with a range of less than $15,999 to over $90,000. The only incentive the students received was a mechanical pencil.

Materials and Procedure

First, a packet with the informed consent form (Appendix A), the demographics sheet, and the socioeconomic status scale (Appendix B) were sent to the students' parents. The demographics page included age, ethnicity, and gender of child. It also included parental occupation and family income.
Then the children, with permission from their parents, were asked for their permission to participate in the study (Appendix C). Children who gave their consent and had parental consent participated in the study, whereas children without full consent were moved to another classroom and participated in another classroom's regularly scheduled activities.

Participants were asked to complete a survey packet (requiring approximately 20 minutes) that included a self-perceived creativity measure (Appendix D) and an activities questionnaire (Appendix E). The self-perceived creativity measure had two parts. The first part had domain general questions on it and used checkmarks to denote the answers. This was followed by a fill-in-the-blank section. Then there was the domain specific part of the questionnaire that allowed each of the four domains to be self-rated. The activities questionnaire was actually a scale written in language appropriate to children to assess participation in educational and growth resources. It asked questions such as, "I have a computer at home" and "I have been to a museum in the last year". Self-assessments of creativity were used in addition to the rated creativity measures.
because they have been shown to have different results (Lee, Day, Meara, & Maxwell, 2002).

Besides the parent SES scale, other measures of SES included a scale where the teachers of the participants assessed each child for perceived involvement in the school lunch program. The teachers of the students guessed the student’s SES based on the child’s perceived involvement in the free or discounted lunch program (Appendix F). The reduced priced lunch cut off for a family of four is $37,000 and the cut off for the same family for a free lunch is $26,000 (United States Department of Agriculture, 2006). Participants who take part in this program were considered to have low SES and participants who do not take part in this program were considered to have high SES. This assessment was conducted at the end of the study as to not bias the teacher’s interactions with the students.

In addition, parental occupation was assessed for level of prestige in accordance with Nakao and Treas (1992). This was done through the Barratt scale of SES which combines level of education with a weighted score for parental occupations. Occupations with more associated prestige have more weight.
Over the next few days participants completed four creative tasks (each requiring approximately 60 minutes) to measure the four domains of creativity: visual arts, language arts, mathematics and science (Appendix G & H). Only one creative task was presented per day and the order of which was alternatively presented to minimize order effects.

For every task the materials each student received were identical. For the art domain task each participant received a blank 8.5" X 11" piece of white paper, glue, crayons, and colored construction paper designs. For the art domain task each participant was asked to make an "interesting, silly design" (Baer, 1991).

For the math domain task participants were given a pencil and a piece of lined paper on which they wrote a creative equation. They were given samples of equations. Then they were asked to write an interesting, original equation (Baer, 1991). This was a reasonable task for fourth grade students. Fourth grade curriculum states that all students should be able to do low level algebra (National Center for Education Statistics, 2006).

For the language arts domain subjects wrote a poem. Subjects were supplied with lined paper and a pencil. For the language arts domain subjects were asked to write a
poem on the topic of the four seasons. The form, style, and length of the poem was not be specified. Subjects were told that except for the topic, everything else about the poem was up to them (Baer, 1991).

For the science domain students were provided with a pencil and a handout that had prompts and spaces on it for them to write on. Students were asked to make up a new animal and describe how it adapted to the habitat it lives in. This was an appropriate task for a fourth grade student because basic life science concepts are integrated into every level of education.

The experiments were held in the participants' classrooms. The teacher was present, but the researcher carried out all aspects of the study. Once the survey packet or creative product was finished it was collected by the researcher. A sticker with the child's identification number on it was placed over the child's name on the back of each creative product. This identification number was linked to the child demographic information.

In addition to the self-rated creativity measures each of the domains were professionally rated for creativity. Five subject matter experts (SME) rated the creative products using the Consensual Assessment
Technique. The Consensual Assessment Technique (CAT) was devised to assess creativity (Amabile, 1982). The CAT is very similar to the way organizations reward creative behavior. Having a group of SME evaluate each product individually, but in relation to the other products, is the same method used by selection committees, job interviewers, and grant reviewers. The CAT uses SME from a relevant domain to rate creative products in that domain and has been shown to be reliable (Baer, Kaufman, & Gentile, 2004; Howard-Jones, Blakemore, Samuel, Summers, & Claxton, 2005; Kaufman, Baer, Cole, & Sexton, 2006; Kaufman, Lee, Baer, & Lee, 2006; Maud, 2001). The SME were blind to the hypotheses and were guided by their own professional judgment to rate the creativity of the products in relation to one another. The SME rated the creativity of the product one at a time based on a 1.0-to-5.0 scale, where 1.0 is the lowest score and 5.0 is the highest score. The SME were supplied with pencils and a rating sheet.

There were 1800 rating sheets (Appendix I) that included a place for the identification number, and a Likert scale from 1-5 with 1 being the least creative and 5 being the most creative. The raters were instructed to
assess creativity based on the following criteria set by Baer, Kaufman, and Gentile (2004). Please see appendix J. There is only one criterion in rating these tests: creativity. I realize that creativity doesn’t exist in a vacuum, and to some extent creativity probably overlaps other criteria one might apply—aesthetic appeal, organization ... but I ask you to rate the (product) solely on the basis of your thoughtful-but-subjective opinions of their creativity. The point is, you are the expert, and you needn’t defend your choices or articulate a definition of creativity. What creativity means to you can remain a mystery—what I want you to do is use that mysterious expert sense to rate the (product) for creativity. (p.113)

Here is a rating sheet, please rate each product one at a time. There is a space for the identification number for the product. The identification number is found on the back of the creative product. Next, there is a space for the rating of the product. Please rate the creativity of the product based on a 1.0-to-5.0 scale where 1.0 is the lowest score and 5.0 is the highest score.

These instructions were also printed on the top of the sheet to ensure that the directions were very clear.
Once the SME were finished rating each product individually, they were paid for their time. Each SME was paid $10 an hour and no one took longer than five hours to complete their ratings. All creative products and rating sheets were kept by the researcher in a secured location.

Lastly, a thank you note with a $10 gift card to Target was given to each of the teachers to express gratitude to them for allowing the study to be conducted during class time. At the end of the study all participants and parents were debriefed (Appendix K & L).

There were several researcher created variables. First a score for each domain needed to be created. The first was rated creativity for the scientific domain; it was created by summing the five SME ratings of the creative product in the science domain. The second variable was rated creativity for the language arts domain; it was created by summing the five SME ratings of the creative product in the language arts domain. The third variable was rated creativity for the visual arts domain; it was created by summing the five SME ratings of the creative product in the visual arts domain. Next was rated creativity for the mathematical domain, it was created by summing the five SME ratings of the creative
product in the math domain. For all of these measures higher scores denoted more creativity.

In addition to rated creativity, creativity was also self-assessed. The variable overall self assessment of general creativity was a measure of generalized creativity as rated by the participant. It was created by summing the scores on the self-assessment of creativity (checkmark) questionnaire where higher scores denoted more creativity. There was another self-assessment of general creativity called self assessment of domains of creativity which was created by summing the scores on the self-assessment of creativity (fill-in-the-blank) questionnaire. The variable self assessment of mathematical creativity was created by summing the scores relevant to the mathematics domain from the self-assessment of creativity (fill-in-the-blank) questionnaire. The variable self assessment of visual arts creativity was created by summing the scores relevant to the visual arts domain from the self-assessment of creativity (fill-in-the-blank) questionnaire. The variable self assessment of scientific creativity was created by summing the scores relevant to the scientific domain from the self-assessment of creativity (fill-in-the-blank) questionnaire. The variable self assessment of language arts creativity was created by summing the scores relevant
to the language arts domain from the self-assessment of creativity (fill-in-the-blank) questionnaire. For all of theses measures higher scores denoted more creativity.

The teacher ratings also needed to be coded. Teachers rated domain general creativity in every child on a 1 to 5 scale where higher scores denoted a more creative child. The variable teacher rated SES was coded as a "0" denoting that the child did not appear to participate in the school lunch program and "1" denoting that the child did appear to participate in the school lunch program.

The measures of SES were also coded. The variable family SES was created by adding family education and family income. These scores were standardized and a median split was performed. The activities questionnaire variable was created by summing the scores on the questionnaire. Higher scores denoted more resources and activities being available to the child. Additionally, the Barratt measure of SES was conducted to see the prestige of the family occupations. It was created by combining the level of school completed by the parents and a weighted occupational score.
Design and Statistics

A 2 x 2 x (4) mixed design was used. The dependent variable was the score given by the subject matter experts. The independent variables were level of SES, gender, and domain of creativity. A repeated measures ANOVA and additional exploratory analyses were conducted in SPSS.
CHAPTER THREE
RESULTS

First an inter-rater reliabilities analysis was run using Cronbach’s alpha to determine if there was sufficient agreement among the raters. For the science task, Cronbach’s alpha was .893. Cronbach’s alpha was .814 for the language arts task. The visual arts task had a Cronbach’s alpha of .797. Cronbach’s alpha on the math task was .779. All of the domains met the cut-off criteria for sufficient inter-rater reliability of .70 (Streiner, 2003).

Prior to analysis the variables gender, overall scientific creativity, overall language arts creativity, overall visual arts creativity, overall mathematical creativity, and family SES were examined for missing values, skewness, kurtosis, and univariate outliers. After assumptions of normality were checked, a repeated measures ANOVA analysis was run.

A missing values analysis was conducted. The data set itself had 78 cases. The following variables had missing data: gender (number present = 66), overall scientific creativity (number present = 71), overall language arts creativity (number present = 68), overall visual arts
creativity (number present = 70), overall mathematical creativity (number present = 68) and family SES (number present = 59). Due to SME error there is a small bit of data missing in all of the rated creativity measures.

To see if any of these variables had missing data that would confound the data analysis, separate variance t-tests were run for each variable to check for a pattern of missing data. There were two variables with a significant pattern of missing data. The first was overall language arts creativity and gender, \( t(15.7) = -2.7, \quad p < .05 \). Children who scored worse on language arts creativity (\( M = 12.25 \)) had parents who were less likely to report child gender, than children who had parents that reported child gender (\( M = 15.5 \)). The second variable with a significant pattern of missing data was overall language arts creativity and family SES, \( t(29.8) = -2.3, \quad p < .05 \). Children who scored worse on language arts creativity (\( M = 12.15 \)) had parents who were less likely to report components of family SES, than children who had parents that reported components of family SES (\( M = 14.68 \)).

Further investigation was needed to decide whether the data was missing at random or missing not at random. After looking at the percentage of data missing, the two highest percentages of missing data were gender (15.4%)
and family SES (24.4%). Both of these variables came from a handout that was sent home for the child’s parent to complete. All the other variables had a low percentage of missing data (less than 15%). Since the variables that were missing the most data were from the same optional measure, the data was not missing at random (NMAR).

Despite the fact that the data is NMAR, the best course of action was to carefully analyze with complete cases only (total N = 47); noting that the ability to generalize may be limited (Tabachnick & Fidell, 2007).

Univariate outliers were examined to check that all assumptions of normality were met. If a standardized score exceeded a criteria of $z = 3.3$ with an associated probability of $p < .001$, it was considered an outlier. Additionally, the standardized scores were compared to the raw scores to assess whether the score was indeed an outlier, or if the variable itself was skewed. For the family SES variable, two outliers were detected, one with a $z$ score of -3.66 and one with a $z$ score of 7.8. The first score was much lower than the rest of the scores for this variable; that family had significantly less education and income than the other participants. The second score was much higher than the rest of the scores for this variable; that family had significantly more
education and income than the other participants. To reduce the impact of these outliers, they were recoded to within the standardized criteria to be closer to the next score as recommended by Tabachnick and Fidell (2007).

An analysis was run to determine if any variables were skewed. The skewness statistic was divided by the standard error resulting in a standardized score for skewness. Looking at the standardized scores a criteria of $z = 3.3$ with an associated probability of $p < .001$ was used. Using this criterion, no variables were found to be skewed. To search for kurtosis, the kurtosis statistic was divided by the standard error resulting in a standardized score for kurtosis. Looking at the standardized scores a criteria of $z = 3.3$ with an associated probability of $p.001$ was used. No variables were found to be kurtotic.

Before running the repeated-measures ANOVA, a few assumptions needed to be evaluated. The assumption of sampling distribution was met, $39 > 20$. To assess homogeneity of covariance, Mauchly's $W$ was assessed and found to be nonsignificant, Mauchly's $W = .52$, $X^2 (5) = 7.70, p > .001$. Since sphericity could not be assumed, the repeated measures ANOVA was run using the Greenhouse-Geisser adjustment.
There were two main research questions that this proposal investigated. The first hypothesis was that there would be a difference between SES categories and domains of creativity. Children that were classified as low SES would perform more creatively in the visual arts and language arts domains of creativity than in the mathematic and scientific domains. In addition, children classified as high SES would perform more creatively in the mathematic and scientific domains rather than in the visual arts and language arts domains.

The second hypothesis proposed that female children would perform more creatively in the language arts domain rather than in the math domain. Additionally, male children would perform more creatively in the math domain rather than the language arts domain.

There was a significant mean difference in creativity score due to domain of creativity (scientific, language arts, visual arts, and mathematical), Greenhouse-Geisser (2.039) = 3.967, p < .05, \( \eta^2 = .234 \). The highest mean creativity score was the scientific domain at 13.18. Next the language arts domain had a mean score of 12.78. The third highest was the visual arts domain with a mean score of 12.72. Finally the math domain had a mean score of 10.72. Please see Figure 1. Twenty three and four tenths
percent of the variance in creativity score was due to the domain of creativity.

Although there was a significant main effect for domain of creativity in this analysis, there were no interactions. There was no significant mean difference in creativity score due to the interaction of domain of creativity (scientific, language arts, visual arts, and mathematical) and SES (low or high), Greenhouse-Geisser $(57.09) = 1.06, p > .05, \eta^2 = .70$. Sixty-nine and five-tenths percent of the variance in creativity score was due to the interaction of domain of creativity (scientific, language arts, visual arts, and mathematical) and SES (low or high). There was no significant mean difference in creativity score due to the interaction of domain of creativity (scientific, language arts, visual arts, and mathematical) and gender (female or male), Greenhouse-Geisser $(2.04) = 1.21, p > .05, \eta^2 = .09$. Eight and five tenths percent of the variance in creativity score was due to the interaction of domain of creativity (scientific, language arts, visual arts, and mathematical) and gender (female or male).

Using a small effect size (Howell, 1989), the power of the experiment does not meet the .8 criteria (Tabachnick & Fidell, 2007). Effect size $f^2 = .2$, 

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\[ \alpha = 0.05, \ N = 47, \ \text{power} = 0.68, \ \text{Critical} \ F (3, \ 39) = 2.85, \ \lambda = 9.4. \]

As an exploratory analysis, multiple bivariate correlations were conducted between: overall self assessment of general creativity, self-assessment of domains of creativity, self-assessment of language arts creativity, self-assessment of visual arts creativity, self-assessment of mathematical creativity, self-assessment of scientific creativity, teacher ratings of creativity, rated creativity for the scientific domain, rated creativity for the language arts domain, rated creativity for the visual arts domain, and rated creativity for the mathematical domain.

The self-assessment of domains of creativity significantly correlated with the teacher ratings of creativity, \( r = 0.42 \). This suggests that there may be a relationship between how much a teacher thinks a child is creative and what the child thinks his or her own creativity is. The score on the overall self-assessment of all domains of creativity increased as the score on the teacher ratings of creativity increased. The overall self-assessment of general creativity significantly correlated to the self-assessment of domains of creativity, \( r = 0.56 \). This indicated that there was a
relationship between how a child rated his or her own general creativity and when a child rated his or her own domains of creativity. The score on the overall self-assessment of general creativity increased as the score on the self-assessment of domains of creativity increased.

When comparing self and rated domain specific creativity most correlations were not significant, as can be seen in Table 1. This suggests that there was no relationship between how people view their own creativity and how experts rate other people's creativity. However, rated creativity for the scientific domain and self-assessment of visual arts creativity was significantly correlated, \( r = -0.34 \). As ratings of scientific creativity increased, student self-assessment of creativity in the visual arts domain decreased. Also significant, rated creativity for the language arts domain and self-assessment of visual arts creativity were correlated, \( r = -0.26 \). As ratings of creativity in the language arts domain increased, student self-assessment of creativity in the visual arts domain decreased. These correlations suggested that there was an inverse relationship between how raters view creativity and how an individual may rate his or her own creativity.
Comparing general self-assessments of creativity and the self-assessed domain creativity there were many significant correlations, as can be seen in Table 2. The overall self-assessment of general creativity significantly correlated to self-assessment of creativity in the visual arts domain, $r = .29$. The overall self-assessment of general creativity significantly correlated to self-assessment of scientific creativity, $r = .42$. The overall self-assessment of general creativity significantly correlated to self-assessment of language arts creativity, $r = .27$. The overall self-assessment of general creativity significantly correlated to self-assessment of mathematical creativity, $r = .36$. These correlations suggest that there is a relationship between an individual’s perspective on their own general creativity and different domains of creativity.

There were also a few significant correlations between the different self-assessments in domains of creativity, as can be seen in Table 3. These correlations suggest that both measures of self-assessed creativity were consistent. Self-assessment of scientific creativity correlated significantly with self-assessment of visual arts creativity, $r = .25$. People who feel they are creative in science likely think they are also creative in
visual arts activities. Self-assessment of scientific creativity and self-assessment of mathematical creativity, r = .28. People who feel they are creative in science likely think they are also creative in math.

Comparing domain specific self-assessments of creativity and the self-assessed domain creativity there were many significant correlations. Self-assessment of visual arts creativity and self-assessment of domains of creativity r = .52. Self-assessment of scientific creativity and self-assessment of domains of creativity were significantly correlated, r = .70. Self-assessment of language arts creativity arts and self-assessment of domains of creativity were significantly correlated, r = .59. Self-assessment of mathematical creativity and self-assessment of domains of creativity r = .58. These correlations suggest that there is a relationship between an individual’s perspective on their own domain specific creativity and individual domains of creativity.

When comparing rated creativity in each domain there were some significant correlations as can be seen in Table 4. When the rated creativity in each domain was compared, rated creativity for the language arts domain and rated creativity for the scientific domain were significantly correlated, r = .48. Also significantly correlated was
rated creativity for the visual arts domain and rated creativity for the language arts domain, $r = .30$. These correlations suggested that there are some relationships between rated creativity domains.

When comparing self-assessed creativity in each domain and teacher ratings of creativity there were some significant correlations as can be seen in Table 5. The teacher ratings of creativity was significantly correlated to self-assessment of creativity in the language arts domain, $r = .39$. Teacher ratings of creativity also significantly correlated to self-assessment of mathematical creativity, $r = .35$. There is a relationship between how teachers view children as more generally creativity and if the child thought he or she was good in either language arts or math.

To explore the relationships between the different measures of SES, bivariate correlations were computed for the following variables: SES for the family, activities questionnaire, teacher-rated SES, mother’s highest level of education, father’s highest level of education, family income, and Barratt’s Assessment of SES.

There were many significant correlations between the different measures of SES, as can be seen in Table 6. Mother’s level of highest level of education was
significantly correlated to SES for the family, $r = .87$. Father’s highest level of education was significantly correlated to SES for the family, $r = .89$. Mother’s highest level of education was significantly correlated to father’s highest level of education, $r = .68$. Family income was significantly correlated to SES for the family, $r = .41$. These relationships were expected as these were all components of the variable family SES.

Similar results were found when looking at the Barratt’s Assessment of SES, which can also be found in Table 6. Barratt’s Assessment of SES was significantly correlated to SES for the family, $r = .79$. Barratt’s Assessment of SES was significantly correlated to mother’s highest level of education, $r = .74$. Barratt’s Assessment of SES was significantly correlated to father’s highest level of education, $r = .66$. These relationships were also expected as these were all components of the variable Barratt’s Assessment of SES. The activities questionnaire and the teacher ratings of SES were not significantly correlated to any other measures of SES.

When comparing the different measures of SES to the other variables some significant correlations were found, as can be seen in Table 7. Self-assessment of mathematical domain creativity and activities questionnaire were
significantly correlated, $r = .27$. Self-assessment of language arts domain creativity and activities questionnaire were significantly correlated, $r = -.28$. As the rating of creativity in the language arts domain increased the score on the activities questionnaire decreased. Self-assessment of visual arts creativity and the activities questionnaire were significantly correlated, $r = .32$. These correlations suggest that there is a relationship between resources a child has and domain dominance of creativity. Self-assessment of visual arts domain creativity and family income were significantly correlated, $r = .31$. Self-assessment of scientific domain creativity and SES for the family were significantly correlated, $r = .28$. These correlations suggest that there is a relationship between level of SES experiences as a child and creativity domain dominance.
CHAPTER FOUR

DISCUSSION

The purpose of this research was to see how SES influenced creativity in four domains: visual arts, language arts, science, and mathematics. The hypothesis was that there would be a significant interaction between level of SES and the domain of creativity. Children classified as low SES were predicted to perform more creatively in the visual arts and language arts domains of creativity than in the mathematical and scientific domains. In addition, children classified as high SES would perform in the opposite manner. The data did not support this view as there was not a significant interaction between SES and the domains of creativity. The second hypothesis tested whether there would be a significant interaction between gender and domain of creativity. Female children were predicted to perform more creatively in the language arts domain than in the mathematical domain. Male children would perform more creatively in the mathematical domain than in the language arts domain. The data did not support this view as there was not a significant interaction between gender and the domains of creativity.
Inter-rater reliabilities were good, with creativity ratings across all domains showing strong agreement (Streiner, 2003). This was an endorsement of the CAT and is in line with much previous research (Amabile, 1982; Baer, Kaufman, & Gentile, 2004; Chen et al., 2002; Howard-Jones, Blakemore, Samuel, Summers, & Claxton, 2005; Kaufman, Baer, Cole, & Sexton, 2006; Kaufman, Lee, Baer, & Lee, 2006; Maud, 2001; Niu & Sternberg, 2001).

Domains

No significant interactions were observed for either of the hypotheses; however there were significant differences in creativity scores due to the domain of creativity: scientific, language arts, visual arts, and mathematical. The creativity score for the scientific domain was the highest, followed by the language arts domain, visual arts domain, and the mathematics domain.

This was evidence supporting domain specificity. One researcher who supported this view was Gardner (1983; 1999; 2006) who proposed many different types of intelligences. Each intelligence operated using a specific type of thinking and problem solving. The proposed intelligences were linguistical, musical, logical mathematical, spatial, bodily kinesthetic, naturalistic,
interpersonal and intrapersonal. In 1988 Gardner extended these intelligences to creativity, also advocating a domain specific view of creativity. This view of creativity is echoed by many researchers (Baer, 1991; 1993; 1994; 1996; 1998, Dow & Mayer, 2004; Runco, 1989). These differences may exist due to personality characteristics (Feist, 1998), age (Simonton, 1988; 1994; 1997), or experience with a specific domain (Csikszentmihalyi, 1996; Hayes, 1989; Simon & Chase, 1973). Domain specificity is not a universally held belief as some researchers hold a domain general view of creativity or a mixed view (Guilford, 1967; Milgram, 1990; Milgram & Livne, 2005; Plucker, 1998; 2004; 2005; Plucker, Runco, & Lim, 2006).

There were some correlations between the subject matter expert (SME) rated domains. The language arts domain and creativity scores for the scientific domain were significantly correlated. As rating of creativity in the language arts domain increased so did the rating of creativity in the science domain. Also correlated was creativity scores for the visual arts domain and creativity scores for the language arts domain. As the rating of creativity in the visual arts domain increased
so did the ratings of creativity in the language arts domain.

Socioeconomic Status

These differences in domains, however, were not likely due to SES. There was no significant interaction between SES and the domain of creativity. This finding was valuable because it can mean those stereotypes of the “starving artist” and the “affluent intellectual” may be baseless. Most individuals’ stereotypes are not very accurate. In Beyer (1999) students incorrectly thought that more males were likely to go to college and that males had higher GPA. Additionally, students misattributed the number of males in “female” majors and the number of females in “male” majors. Academic stereotypes are not the only type of stereotype that is overly exaggerated. Hall and Carter (1999) found that people over-exaggerate stereotypes about gender.

When looking at the correlational data there were some significant correlations. Rated creativity for the scientific domain and SES for the family were significantly correlated. This was in line with the directional hypothesis presented by this study. As the rating of creativity in the science domain increased so
did the family SES. It also coincided with Simonton (1986), who said that domains such as science require a quality education that would present scientific material in order to gain the knowledge base necessary to formulate scientific creativity. Thus most scientists attain higher levels of education than artists who do not require this type of education (Goertzel, Goertzel, & Goertzel, 1978; Raskin, 1936; Simonton, 1986).

The correlation between the visual arts domain and SES was in an opposite direction than hypothesized. Visual arts creativity increased as level of SES increased. This may be a product of a modern, materialistic society. Possibly being an artist no longer requires the financial sacrifices it once did. The average yearly income for all types of artists in the United States is $45,317 (MonsterTrak, 2007). While this is a mean, there are probably considerable disparities in salary depending on the type of artist. An artist working for a marketing department may earn more than a potter. There may be more funding available for artists these days. The bulk of the funding that is extended to artists is through local art agencies which could include finances, housing, and educational stipends (Galligan, & Cherbo, 2004).
Additionally, technology has changed the world of art. Artists may still spend time painting in a studio, but their work can be scanned and reprinted for additional income. Also, many companies desire art work to make their product labels prettier. A job description for an artist included, “Provides support for company advertising and/or promotional efforts.” In fact, at $45,317 artists earn slightly less than mathematicians ($48,829), but can potentially earn more than an entry-level scientist (earning $42,573) and writers ($38,401) (MonsterTrak, 2007).

While conflicting results were found concerning domain of creativity and level of SES, there was evidence that showed that children with more resources were more creative in domains that require many resources. There was a relationship between the self-rated mathematical domain and the activities questionnaire. Children with more resources thought they were more creative in the math domain. This was in line with the directional hypothesis. It was also in line with researchers who believe environmental factors are critical to later success (Alexander, 2001; Davis, 1998; Entwisle, 2005; Raskin, 1936; Simonton, 1994).
Lastly, there was a relationship between the self-rated domain of visual arts and the activities questionnaire. Children with more resources thought they were more creative in the visual arts domains. This result was not congruent with the original hypothesis; however it is also supported by data on professional salaries (MonsterTrak, 2007). Perhaps with the modernization of art into more sophisticated realms, more resources are required to be an artist. Future studies could look at how expensive technology has changed the art world over the last one hundred years.

Gender

There was no significant mean difference in creativity score due to the interaction of the domain of creativity (scientific, language arts, visual arts, and mathematical) and gender (female or male). It was interesting to find females and males perform relatively similar in all the domains. This was in accordance with some of the research on creativity and gender (Niu, & Sternberg, 2001, Razumnikova, & Bryzgalov, 2006; Russ, & Grossman-Mckee, 1990; Saeki, Fan, & Van Dusen, 2001).

There was a disparity in test performance and gender; however in this research it was not evident. Many studies
have looked at gender and achievement. In a sample of all American children, the National Center for Education Statistics (2006) found that males outperformed females on standardized math tests. The same differences in performance were found on standardized testing (Baloglu & Kocak, 2006; Casey, Nuttall, & Pezaris, 1997; Casey, Nuttall, Pezaris, & Benbow, 1995). Males may appear to be more adept in mathematics than females, but this does not mean that they are more creative in mathematics. Research has shown that being qualified as being more talented in a domain does not mean that an individual is more creative (Feist, 1999).

If females know women generally perform below males in mathematics, they may have more anxiety when testing. This stereotype threat has been shown to decrease an individual’s ability to perform well when they believe they are testing in an area that is stereotypically hard for their demographic (Croizet & Claire, 1998; Croizet et al., 2004). While differences do exist in achievement literature, in this study there were no differences in creative achievement due to gender. Perhaps females do not perceive creativity as an area where they are stereotyped, and thus are not subject to the stereotyping threat.
Another reason that gender differences were not apparent could be due to the age of the sample. Research shows that as female children proceed through adolescence their math achievement scores drop (Hyde, Fennema, & Lamon, 1990; Leahey & Guo, 2001; Linver & Davis-Kean, 2005). Therefore, the children used in this sample may not have been old enough to exhibit this gender and achievement difference.

Developmental

There were no self and SME rated correlations. This suggested that children have yet to gain insight into how creative they are, and in what domains they are creative in. The children who participated in this study were on the borderline of two of Piaget’s developmental periods: the concrete operational stage and the formal operational stage (Piaget, 1924). In spatial abilities, this is the difference between being able to see an object and draw it, and seeing an object and including the perspective; making the picture not only one identifiable object but also part of the scene with depth and shading (Gardner, 1980). As far as cognitive development, this is the difference between being able to observe natural phenomenon and the ability to think abstractly and to draw
conclusions (Piaget, 1924). Perhaps the children are not developmentally prepared to critically assess their own creativity accurately.

The literature on metacognition suggests that nine and ten-year-old children should be able to be introspective (Flavell, Green, & Flavell, 2000; Kuhn, 2000; Panaoura, & Philippou, 2007). They are able to monitor their memory concerning declarative memories, but not procedural memories (Lockl, & Schneider, 2002). For example, a child could remember that they were told that they were very creative in a domain, but not be able to discern how they carried out a performance on a creativity measure. Whatever the reason, children are not alone; most creative geniuses are not very accurate at using introspection about their creativity (Simonton, 1994).

Teachers

Teacher ratings of creativity didn’t correlate to any SME rated measures of creativity. However, teacher ratings of creativity were significantly correlated to self-assessed language arts and self assessed mathematical creativity. Teachers rated a student as more creative if the student thought they were creative in either language arts or math. Possibly students absorbed the expectations
set by their teacher, or perhaps teachers think students who are more confident in language arts or mathematics are also more creative. Interestingly, teachers' perceptions of how creative a child is had little to do with how creative the child was as measured by the SME. This was not the first study to find such a link (Priest, 2006).

Certain traits associated with creativity were not necessarily functional in the school environment (Cramond, 1994). One component of creativity was coming up with new and different ideas. If a teacher was trying to teach a mathematical concept, say \(1 + 1 = ?\), and a child made every guess but 2, then they would probably be considered slow or in need of more training, rather than creative. Also the teacher must want each child to be creative and allow them the opportunity to be different from their peers, which was not always something every teacher was willing to do (Smith, 1966).

Limitations

One major drawback to this study was the significant amount of data not missing at random. This was due mainly due to the fact that parents did not complete the optional SES form, which also included student gender. While this limits the ability to generalize the study, it is possible
that future studies could require the SES form, thereby reducing the chances that there would be a significant pattern of missing data.

Children who scored lower on language arts creativity had parents who were less likely to report child gender. Additionally, children who scored lower on language arts creativity had parents who were less likely to report components of family SES. Possibly those children had parents who had lower levels of English proficiency, and thus didn’t complete the optional measure. Their children may have had less English proficiency and lower levels of language arts creativity simply because it was a second language.

Another drawback of this study was the lack of power. Since the sample size was small to start with and then it became even smaller with the missing data there was not sufficient power. Future studies could remedy this problem by starting with a larger sample size and requiring the SES measure.

Future Studies

It is interesting that children could not correctly identify what they were and were not creative in. Future studies should look more closely at the relationship of
age in years, physical development, and cognitive development, to see when children gain insight into their own creativity. Many parents and schools try to foster childhood creativity. This may be often based on the teacher’s or the child’s interests rather than the child’s actual creativity. This paper is not advocating reducing the time spent trying to foster childhood creativity. Simply, it may be more functional to see if what is being fostered in the child is what the child is creative in, or what the child thinks he or she is creative in.

Other future studies should further investigate the lack of the teacher’s insight into the student’s own creativity. Why was this so? Were these subject areas more salient to them, more representative of what they think being creative is, or was it something else? Much research has been devoted to the effects of teacher expectations of students (Diamond, Randolph, & Spillane, 2004; Rubie-Davies, 2006; Wood, Kaplan, & McLoyd, 2007), but in this study why does the rated creativity not correlate with the teacher’s evaluation at all? Teacher’s judgments of students seem to have little influence in their student’s real creativity.

Future studies can be developed to isolate what exactly it is about SES that exerts this influence on the
scientific and visual arts domains. Resources, quality of schooling, and access to good mentors, can all be investigated. Once this knowledge is obtained, programs can be developed to encourage artistic and scientific creativity in low SES children.

Conclusion

There were four notable findings from this study. First, a significant difference between the domains of creativity was found. Second, significant positive correlations between SES and science and SES and visual arts were found. Third, while correlations were found, no significant mean differences between SES and the domain of creativity were found. Last, there were also no significant mean differences between gender and the domain of creativity. This work adds to the literature on childhood creativity, factors that influence creative expression, domain specificity, and the effects socioeconomic status has on creativity.
Table 1. Correlations between Self and Rated Creativity in Four Domains: Scientific, Language Art, Visual Art, and Mathematics

<table>
<thead>
<tr>
<th>Rated Creativity for Domains and Self Assessed Creativity for Domains</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific</td>
<td>-0.07</td>
</tr>
<tr>
<td>Language art</td>
<td>-0.22</td>
</tr>
<tr>
<td>Visual art</td>
<td>-0.08</td>
</tr>
<tr>
<td>Mathematics</td>
<td>0.07</td>
</tr>
</tbody>
</table>

** = p < .01, two tailed
* = p < .05, two tailed

Table 2. Significant Correlations between General Self-Assessments of Creativity and Self-Assessed Domains Measure

<table>
<thead>
<tr>
<th>Self-assessed of Domains of Creativity</th>
<th>Overall Self-assessment of General Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Arts</td>
<td>0.29*</td>
</tr>
<tr>
<td>Scientific</td>
<td>0.42**</td>
</tr>
<tr>
<td>Language Arts</td>
<td>0.27*</td>
</tr>
<tr>
<td>Mathematical</td>
<td>0.36**</td>
</tr>
</tbody>
</table>

** = p < .01, two tailed
* = p < .05, two tailed
Table 3. Significant Correlations between Domain Specific Self-Assessments of Creativity and Self-Assessed Domains

<table>
<thead>
<tr>
<th>Self Assessed Domains of Creativity</th>
<th>Overall Self Assessment of Domain Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Arts</td>
<td>0.52**</td>
</tr>
<tr>
<td>Scientific</td>
<td>0.7**</td>
</tr>
<tr>
<td>Language Arts</td>
<td>0.59**</td>
</tr>
<tr>
<td>Mathematical</td>
<td>0.58**</td>
</tr>
</tbody>
</table>

** = p < .01, two tailed  
* = p < .05, two tailed

Table 4. Correlations between Rated Domain Creativity

<table>
<thead>
<tr>
<th>Rated domains of creativity</th>
<th>Visual Arts</th>
<th>Scientific</th>
<th>Math</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language Arts</td>
<td>0.30*</td>
<td>0.48**</td>
<td>0.14</td>
</tr>
</tbody>
</table>

** = p < .01, two tailed  
* = p < .05, two tailed
Table 5. Correlations between Self-Assessed Domains and Teacher Ratings of Creativity

<table>
<thead>
<tr>
<th>Self Assessment of Domain Creativity</th>
<th>Teacher Rating of Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language Arts</td>
<td>0.39**</td>
</tr>
<tr>
<td>Mathematical</td>
<td>0.35**</td>
</tr>
<tr>
<td>Visual Arts</td>
<td>0.01</td>
</tr>
<tr>
<td>Science</td>
<td>0.21</td>
</tr>
</tbody>
</table>

** = p < .01, two tailed

Table 6. Significant Correlations between Measures of Socioeconomic Status

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mother's Highest Level of Education</th>
<th>Father's Highest Level of Education</th>
<th>Family SES</th>
<th>Family Income</th>
<th>Bartlett's Assessment of SES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother's Highest Level of Education</td>
<td>1</td>
<td>~</td>
<td>~</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>Father's Highest Level of Education</td>
<td>0.68**</td>
<td>1</td>
<td>~</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>Family SES</td>
<td>0.87**</td>
<td>0.89**</td>
<td>1</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>Family Income</td>
<td>0.13</td>
<td>0.17</td>
<td>0.41**</td>
<td>1</td>
<td>~</td>
</tr>
<tr>
<td>Bartlett's Assessment of SES</td>
<td>0.74**</td>
<td>0.66**</td>
<td>0.79**</td>
<td>0.17</td>
<td>1</td>
</tr>
</tbody>
</table>

** = p < .01, two tailed
* = p < .05, two tailed
Table 7. Significant Correlations between Measures of Socioeconomic Status and Self-Rated Domains of Creativity

<table>
<thead>
<tr>
<th>Domain</th>
<th>Family SES</th>
<th>Family Income</th>
<th>Activities Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematical</td>
<td>0.14</td>
<td>0.1</td>
<td>0.27*</td>
</tr>
<tr>
<td>Language Arts</td>
<td>-0.23</td>
<td>-0.08</td>
<td>0.14</td>
</tr>
<tr>
<td>Visual Arts</td>
<td>-0.68</td>
<td>-0.07</td>
<td>0.32*</td>
</tr>
<tr>
<td>Scientific</td>
<td>0.28*</td>
<td>0.09</td>
<td>0.2</td>
</tr>
</tbody>
</table>

* = p < .05, two tailed

Figure 1. Means for Each Domain of Creativity: Language Arts, Visual Arts, Mathematics, and Science
APPENDIX A

PARENTAL INFORMED CONSENT FORM
Informed Consent (Parent)

Your child has been invited to participate in a study being conducted by Michelle Evans, a graduate student in the Psychology Department at California State University, San Bernardino under the supervision of Professor James Kaufman. This study has been approved by the Department of Psychology Institutional Review Board Sub-Committee of the CSUSB, and a copy of the official Psychology IRB stamp of approval should appear on this consent form. The purpose of this study is to examine the impact of socioeconomic status on creativity. If you agree to let your child participate, she or he will participate in fun creative activities in class. If you decide you would rather your child was not involved with this study, arrangements will be made for them to participate in other classroom activities. There are no foreseeable risks beyond those of everyday life, nor direct benefits, associated with this study. Your child’s participation will take a total of approximately 45-60 minutes, consisting of several shorter sessions conducted over the course of a month. Your child’s participation is voluntary, and you may withdraw him or her from participation at any time. Results from this study will be available from Michelle Evans (909) 537-5570 or Dr. James Kaufman (909) 537-3841 after December 2007.

Please read the following before indicating that you are willing to participate.

1. The study has been explained to me and I understand the explanation that has been given and what my child’s participation will involve.

2. I understand that I am free to choose not to let my child participate in this study without penalty, free to discontinue my child’s participation in this study at any time and am free to choose not to answer any questions that make me or my child uncomfortable.

3. I understand that no identifying information will be collected and so my child’s responses will remain completely anonymous. I may request group results of this study after December 2007.

4. I understand that, at my request, I can receive additional explanations of this study after my child’s participation is completed.

Please sign in the space provided below to acknowledge that you are at least 18 years old and have read and understand the statements above. By marking the space below you give consent for your child to participate voluntarily in this study.

Thank you!

______________________________
Your signature

______________________________
Date

______________________________
Name of your child:

The California State University
Bakersfield • Channel Islands • Chico • Dominguez Hills • East Bay • Fresno • Fullerton • Humboldt • Long Beach • Los Angeles • Monterey Bay • Northridge • Pomona • Sacramento • San Bernardino • San Diego • San Francisco • San Jose • Sonoma • Stanislaus
APPENDIX B

SOCIOECONOMIC STATUS QUESTIONNAIRE
Socioeconomic Status Questionnaire

Name of child: __________________________

Age of child: ______

Gender of child: Male Female

Please indicate below the group membership with which your child would most strongly identify with (check one):

☐ African American/Black
☐ Native American/ American Indian
☐ Asian American/ Pacific Islander
☐ European American/ White
☐ Hispanic/Latino
☐ Multiethnic/Other: ___________

What is the highest level of education that the MOTHER of your child completed?

☐ Grade 5 or below. ☐ Some college.
☐ Between grade 5 and 8. ☐ Completed college degree.
☐ Some high school but didn’t finish. ☐ Graduate degree.
☐ Completed high school degree.

What is the job title for the MOTHER of your child? (Ex: Administrative Assistant, Restaurant Manager, Factory Worker): __________________________________________________________

What is the highest level of education that the FATHER of your child completed?

☐ Grade 5 or below. ☐ Some college.
☐ Between grade 5 and 8. ☐ Completed college degree.
☐ Some high school but didn’t finish. ☐ Graduate degree.
☐ Completed high school degree.

What is the job title for the FATHER of your child? (Ex: Administrative Assistant, Restaurant Manager, Factory Worker): __________________________________________________________

What was your total family income last year (from all sources, before taxes)? This refers to the combined incomes of all individuals living in your home:

☐ less than 15,999 ☐ $50,000 to $59,999
☐ $15,999 to $19,999 ☐ $60,000 to $69,999
☐ $20,000 to $29,999 ☐ $70,000 to $79,999
☐ $30,000 to $39,999 ☐ $80,000 to $89,999
☐ $40,000 to $49,999 ☐ $90,000 or more

What is the total combined number of people who live in your household? __________________
APPENDIX C

CHILD ASSENT FORM
Child Assent Form

I am being invited to be in a research study. The researcher will tell me about the study. The study is about how people's background affects their creativity. I can tell the researcher whether or not I want to be in this study. The researcher wants me to ask any questions that I have about the study. The researcher will answer my questions.

Miss Michelle Evans is in charge of this study. Professor James Kaufman is helping her do this study. This study is for me to practice being creative.

Miss Evans asked me to be in the study because I am in a classroom that thinks creativity is neat. This study will look at how children think they are creative. It also looks at how children act creatively.

I do not have to be in this study. I can stop any time I want to. If I do stop or if I do not want to be in the study, it's okay. No one will be mad at me. The researcher will let me be in another classroom while the study is going on in my classroom. If I don't want to be in the study, then I can just tell the teacher and I will be moved to another classroom.

If I do not like being in this study I should tell my mom and dad. If I do not like being in this study I should tell the teachers. I should tell them if I don't want to be in the study. I can ask them stuff about the study. They will answer my questions. My parent or guardian knows about this study. They said that I could be in the study.

I have read this paper. The researcher will also explain it to me. I will have a chance to ask questions. They will answer the questions so that I can understand. If I have more questions, my parents or I can call Michelle Evans (909) 537-5570 or Dr. James Kaufman at (909) 537-3841. I will be in the study.

Name (print)

Signature or X

Date
APPENDIX D

CHILD’S SELF-ASSESSMENT OF CREATIVITY
Name: _____________________________

Self-assessment of Creativity

Please check how you feel about yourself based on these statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree Nor Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think I am very creative in general</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am good at thinking of new and different ideas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I don't have much of an imagination</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>People say that I am more creative than most other people</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I like thinking of original and new things</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I prefer to do things the way I am told to do them</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Please complete the sentence:

I think I am very creative in ____________________.

I think I have less imagination in ____________________.

Please circle whether you are or you are not creative in a given subject.

I think I am creative in math. I Am I Am Not
I think I am creative in art. I Am I Am Not
I think I am creative in writing. I Am I Am Not
I think I am creative in science. I Am I Am Not

Please circle the answer that matches your answer most closely.
1. How creative in math do you think you are?
   Not very Somewhat Very

2. I think I have a good imagination when solving math equations.
   Not very Somewhat Very

3. How creative in art do you think you are?
   Not very Somewhat Very

4. I think I have a good imagination when completing art projects.
   Not very Somewhat Very

5. How creative in writing do you think you are?
   Not very Somewhat Very

6. I think I have a good imagination when I am writing.
   Not very Somewhat Very

7. How creative in science do you think you are?
   Not very Somewhat Very

8. I think I have a good imagination when I am solving science problems.
   Not very Somewhat Very
APPENDIX E

ACTIVITIES QUESTIONNAIRE
Name: ______________________________

Please circle Yes OR No to answer each question:

Yes  No  I eat three meals a day.

Yes  No  I have traveled outside of Visalia in the last year.

Yes  No  My parents read books to me.

Yes  No  I have been to a museum in the last year.

Yes  No  I have a computer at home.

Yes  No  I have been to a play in the last year.

Yes  No  I participate in 2 or more activities outside of school per year.

Yes  No  My parents attend my activities outside of school some of the time.

Yes  No  I spend 6 or more hours doing activities with my parents a week.
APPENDIX F

TEACHER RATINGS SHEET
## Teacher Rating Sheet

<table>
<thead>
<tr>
<th>Name of child:</th>
<th>They appear to receive free or discounted lunch</th>
<th>They DO NOT appear to receive free or discounted lunch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jonny Boy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

They appear to receive free or discounted lunch.

They DO NOT appear to receive free or discounted lunch.
APPENDIX G

CREATIVITY TASKS FOR DOMAINS
Mathematical Creativity Task

For the math domain task participants were given a piece of lined paper and pencil. They were given samples of equations \((2+2 = 2+2, (9+4)-6 = 4+A)\). Then they were asked to write an interesting, original equation (Baer, 1991). This was a reasonable task for fourth grade students. Fourth grade curriculum stated that all students should be able to do low level algebra (National Center for Education Statistics, 2006).

Poetry Making Task

For the language arts domain subjects wrote a poem. Subjects were supplied with lined paper and a pencil. They were asked to write an original poem on the topic of the four seasons. The form, style, and length of the poem were not specified. Subjects were told that except for the topic, everything else about the poem was up to them (Baer, 1991).

Collage Making Task

For the visual art domain task each participant received a blank 8.5” X 11” piece of white paper, glue, and a set of pre-cut construction paper designs. Participants were asked to make an “interesting, silly design” (Baer, 1991). The materials each student received were identical. In addition to these supplies, stickers printed with the child’s name were placed on each creative product.
APPENDIX H

SCIENTIFIC CREATIVITY TASK
Scientific Creativity Task

Name: _____________________________

There is an animal named Zook that lives here on earth. A Zook is light in color, has big sharp teeth, and a tail.

1. What type of animal do you think a Zook is?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

2. Why?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

3. Where do you think Zooks live?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
4. How would the habitat meet the needs of the Zook?

5. What living and nonliving things would be in this habitat?

6. What do you think Zooks eat?

7. How do they get their food?
Now pretend that all the Zooks in the world were moved to a tropical location.

1. How will the Zooks' lives change?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

2. Now that the Zooks have lived in a tropical place for twenty years, what do you think that the new Zook babies will look like?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
APPENDIX I

RATING SHEET
Name of Rater: ____________________

Rating Sheet (Baer, 1993)

Please rate each product one at a time. There is a space for the identification number for the product. The identification number is found on the back of the creative product. Next, there is a space for the rating of the product. Please rate the creativity of the product based on a 1.0-to-5.0 scale where 1.0 is the lowest score and 5.0 is the highest score.

Product Type: Poetry        Math Equation        Collage        Science

Identification number: __________________________________________

Product rating: ________________________________________________

1.0   1.5   2.0   2.5   3.0   3.5   4.0   4.5   5.0

Not very Creative  ↔   Very Creative
APPENDIX J

DOMAIN DEFINITIONS
Directions for Domains of Creativity Rating (Baer, 1993)

Poetry:

There is only one criterion in rating these tests: creativity. I realize that creativity doesn’t exist in a vacuum, and to some extent creativity probably overlaps other criteria that might apply- aesthetic appeal, organization, richness of imagery, sophistication of expression, novelty of word choice, appropriateness of word choice, and possibly even correctness of grammar, for example- but I ask you to rank the poems solely on the basis of your thoughtful-but-subjective opinions of their creativity. What creativity means to you can remain a mystery-what I want to do is use that mysterious expert sense to rank order the poems for creativity.

Math Equation:

There is only one criterion in rating these tests: creativity. I realize that creativity doesn’t exist in a vacuum, and to some extent creativity probably overlaps other criteria that might apply- degree of difficulty, novelty, aesthetic appeal, usefulness in teaching a concept, appropriateness, and precision, for example- but I ask you to rank the equations solely on the basis of your thoughtful-but-subjective opinions of their creativity. What creativity means to you can remain a mystery-what I want to do is use that mysterious expert sense to rank order the equations for creativity.
Collage:

There is only one criterion in rating these collages: creativity. I realize that creativity doesn’t exist in a vacuum, and to some extent creativity probably overlaps other criteria that might apply- aesthetic appeal, organization, use of color, novelty, complexity, balance, symmetry, technical goodness, neatness, and possibly even detail, for example- but I ask you to rank the collages solely on the basis of your thoughtful-but-subjective opinions of their creativity. What creativity means to you can remain a mystery-what I want to do is use that mysterious expert sense to rank order the collages for creativity.

Science:

There is only one criterion in rating these tests: creativity. I realize that creativity doesn’t exist in a vacuum, and to some extent creativity probably overlaps other criteria that might apply- novelty, appropriateness, ability to make predictions about the future, logical reasoning, and possibly even completeness of answers, for example- but I ask you to rank the test solely on the basis of your thoughtful-but-subjective opinions of their creativity. What creativity means to you can remain a mystery-what I want to do is use that mysterious expert sense to rank order the tests for creativity.
APPENDIX K

CHILD DEBRIEFING STATEMENT
DEBRIEFING STATEMENT

Name:________________________________________________

Thank you for being involved in this study. The questions and tasks measured your creativity. My interest is in examining whether differences in how you were raised influence your creativity. Your participation and the participation of your classmates provided me with important information about creativity.

If you have any questions about the results of this study, you can ask your parent to call Michelle Evans (907) 537-5570 or Dr. James Kaufman (907) 537-3841 after December 2007.

Thank you for your participation!

Please keep this page.
APPENDIX L

PARENT DEBRIEFING STATEMENT
DEBRIEFING STATEMENT

Name: _____________________________

I appreciate your willingness to allow your child to participate in this study. The questions and tasks were designed to measure your child’s perceived and true creativity. My interest is in examining whether differences in types of creativity can be influenced by the socioeconomic status of your child, which was also measured in the study. Your participation, the participation of your child, and the participation of others will provide me with important insights into how socioeconomic status can influence creative expression.

If you have any questions about the results of this survey, you can call Michelle Evans (909) 537-5570 or Dr. James Kaufman (909) 537-3841 after December 2007.

Thank you for your participation!
REFERENCES


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