Studying the relationship between parental involvement and Sternberg's triarchic theory of intelligence

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STUDYING THE RELATIONSHIP BETWEEN PARENTAL INVOLVEMENT AND STERNBERG’S TRIARCHIC THEORY OF INTELLIGENCE

by

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A Thesis submitted in partial fulfillment of the requirements for the Honors in the Major Program in Psychology in the College of Arts and Sciences and in The Honors College at the University of Central Florida Orlando, Florida

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ABSTRACT

Extensive research has been conducted in the area of intelligence. Most of the research in this area has been focused on cognitive abilities. However, little research has been explored other type of intelligence and the environmental factors. The intent of this study was to investigate Sternberg's Theory of Intelligence and parental involvement. According to this theory an individual’s intelligence is composed of three main domains: cognitive, creative and practical. Every individual possesses these abilities to a greater or lesser degree. Yet, little is know of what factors could lead to the difference in these types of abilities in individuals. Parental involvement was used in this study as the independent variable. The main question this research sought to answer was whether parental involvement would have an effect on these types of abilities. It was hypothesized that individuals with less parental involvement would score have higher creative and practical abilities. On the other hand, individuals with greater parental involvement would have higher cognitive abilities. The results did not indicate that parental involvement had an effect on these types of abilities. However, it was found that females reported more parental involvement than males. In addition, males score higher on the cognitive and practical subtest. Although, the results were not significant in the study. I believe is still of great interest to understand what environmental factors could be responsible for these types of abilities.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>ANALYTICAL INTELLIGENCE</td>
<td>3</td>
</tr>
<tr>
<td>CREATIVE INTELLIGENCE</td>
<td>5</td>
</tr>
<tr>
<td>PRACTICAL INTELLIGENCE</td>
<td>6</td>
</tr>
<tr>
<td>COGNITION AND ENVIRONMENT</td>
<td>11</td>
</tr>
<tr>
<td>COGNITION AND CONTEXT</td>
<td>15</td>
</tr>
<tr>
<td>MATHEMATICS AND PRACTICAL LEARNING</td>
<td>17</td>
</tr>
<tr>
<td>PRACTICAL LEARNING IN THE ENVIRONMENT</td>
<td>20</td>
</tr>
<tr>
<td>CREATIVITY AND MOTIVATION</td>
<td>23</td>
</tr>
<tr>
<td>PARENTAL INVOLVEMENT</td>
<td>26</td>
</tr>
<tr>
<td>METHOD</td>
<td>32</td>
</tr>
<tr>
<td>PARTICIPANTS</td>
<td>32</td>
</tr>
<tr>
<td>DESIGN</td>
<td>32</td>
</tr>
<tr>
<td>MATERIALS</td>
<td>33</td>
</tr>
<tr>
<td>PROCEDURE</td>
<td>36</td>
</tr>
<tr>
<td>RESULTS</td>
<td>38</td>
</tr>
<tr>
<td>DISCUSSION</td>
<td>45</td>
</tr>
<tr>
<td>APPENDIX A</td>
<td>50</td>
</tr>
<tr>
<td>PARENTAL INVOLVEMENT SCALE</td>
<td>50</td>
</tr>
<tr>
<td>APPENDIX B</td>
<td>52</td>
</tr>
<tr>
<td>HOW I LEARN SCALE</td>
<td>52</td>
</tr>
<tr>
<td>APPENDIX C</td>
<td>56</td>
</tr>
<tr>
<td>STERNBERG'S TRIARCHIC ABILITIES TEST</td>
<td>56</td>
</tr>
<tr>
<td>REFERENCES:</td>
<td>57</td>
</tr>
</tbody>
</table>
Introduction

Extensive research has been done in the field of intelligence. However, most of the study has been focused on cognitive abilities. Cognitive abilities focus on analytical and verbal abilities, usually measured by standard I.Q Tests. Robert J. Sternberg has introduced a new way of measuring intelligence, by accepting cognitive abilities as well as creative and practical abilities in assessing it. In this study, we are interested in studying Sternberg’s Triarchic Theory of Intelligence and its relationship to some specific environmental factors. The factors in this study include parental involvement, and how a child learns from his/her environment in relationship to internal and external factors, internal factors such own self initiating behavior, and external factors as the availability resources from the environment. Performance on Sternberg’s Triarchic Abilities Test is the main dependent variable. In addition, gender, age, and g.p.a. were taken into consideration for the purpose of this study.

However, the main emphasis will be on cognitive and practical abilities. Although, we are interested on the affect of parental involvement on creative abilities, it is not the accentuation of the study. Since creativity is such a abstract issue and research in this area seems to be quite contradictory, it should be noted that any creativity terminology used in this study refers to the simple description of creativity as a way to come up with novels ideas. Therefore, we are not referring to creativity as in musical, or writing abilities.

My hypothesis is that those students who receive less parental involvement would tend to be stronger in creative and practical abilities. When an individual does not receive
help from his/her environment in order to learn, or accomplish a task, such as homework, the child would more likely rely on himself or herself, in order to perform the task at hand. When a person depends on his or her own resources and thinking process to accomplish such a matter, it would be expected that if the child does not have the information, or help necessary would try to come up with the tools needed to resolve the problem at hand.

According to the Triarchic Theory of Intelligence proposed by Robert J. Sternberg (1996) intelligence is divided in three components: Analytical, Creative and Practical Intelligence. However, all individuals possess these types of abilities to a greater or lesser degree, that is an individual can be high on the three types, or low on the three type, yet, a person could be strong on cognitive abilities, and still be low on creative and practical abilities. Therefore, it is the interest of this study to seek to understand if environmental factors could be somewhat responsible for this difference in a person's intelligence, according to this theory.

Furthermore, I would like to point out an interesting point from the study Dr. Sternberg conducted at Yale, known as "Yale Summer Psychology Program" (1997). In this study Sternberg found that students who were high in analytical abilities were mainly white, middle-to upper-middle class students from well-known schools. The group that was high in creative and practical abilities were much more diverse racially, ethnically, and socioeconomically.

The next section will try to explain these types of intelligence according to the research carried out by Dr. Sternberg.
Analytical Intelligence

Analytical Intelligence is used in cognitive abilities such as memory, analyzing, evaluating, and judging. These abilities are commonly measured by synonym and antonym problems, verbal analogies, number series, and cloze procedures (given a blank space, the individual has to decide what comes next in a series). (Sternberg, 1994). In addition analytical intelligence is used in problem solving ability.

Subsequently, Sternberg (1996) explains the process required to analyzing a problem (e.g. problem solving) and finding a solution to the problem (e.g. decision making). This process requires six steps, defined as the problem-solving cycle. The first step in problem-solving is problem recognition; the individual must be able to recognize the problem. For example a person might have a certain problem, which keeps repeating, if the individual is aware of the existence of the problem he/she will be able to approach it.

The second step is problem definition. Once the problem has been recognized, the individual must be able to define it. When a problem is not correctly defined, the same pattern will be constantly repeating, thus never actually confronting the real problem. Therefore, the individual must analyze the reasons why the problem is affecting the behavior, or situation. The third step is to formulate a strategy to solve the existing problem. In this step the individual must make a decision on how to solve the problem, focusing on long term goals and results rather than rushing into a short time solution. A short-term solution might not actually deal with the problem, since it could return.
The fourth step is *representation of information*, how the individual represents information when solving the problem. This focuses on how the person uses the information he or she is presented with in the environment in which it is encountered and its solutions in such context. Representation of a problem should be as accurate as possible without letting other factors influence judgement, (e.g. an individual can be misled by giving wrongful information about a person or situation). It influences and clouds one’s judgement about the problem.

The fifth step is *allocation of resources*, which involves how the individual allocates the resources available, such as time management, money investment, etc. Allocating resources involves both the short and long term goals, by considering risk-reward rations, and by choosing the allocations that will have greater results in solving the problem. The last step in problem solving is *monitoring and evaluation* which implies keeping track of the progress and process of the problem. This enables the individual to access the problem and its consequences, accepting any errors, which may have been made. (Sternberg, 1996).

As it can be observed, analytical intelligence is very important in our daily living, since it is necessary for problem solving. However, even in the process of problem solving, analytical intelligence is not used alone, or independently of other abilities such as creative and practical, which are also necessary for the process of problem solving. I will proceed to define in the next two sections, creative and practical intelligence.
Creative Intelligence

According to Sternberg (1996), creative intelligence requires the use of those abilities that involve the production of novel and high-quality ideas in any field. When using creative intelligence, ideas or situations that are ordinary are turned into novel, original ones. Examples of such tasks are writing an article, or data analysis. (Sternberg, 1994). A small project with few resources can be turned into a greater, more useful one by the use of creative intelligence. (Sternberg, 1996). The problem encountered with creative intelligence is that it is usually not widely accepted by others as a factor of intelligence. Because of its own definition, when an individual comes up with something creative, it is usually rejected by the majority who cannot conceive the creativity in the idea. Thus, creative intelligence has a great potential of being discouraged by within the popular culture (Sternberg, 1996).

Sternberg (1996) points out that creative intelligence is not alone the ability to come up with novel and unique ways of using something, or developing ideas. However, he proposes that creative intelligence is a bridge between analytical intelligence and practical intelligence. With creative intelligence the individual needs to use both of the other abilities. Analytical ability will help the individual to analyze his/her own ideas and evaluate them. Subsequently, practical ability will enable the individual to decide which ideas can be best applied to the external world, and how these ideas can be presented to the rest of the population. An individual who uses his/her creative abilities independently of the two other abilities will not be able to analyze and infer his/her ideas. Since, it is understood that cognitive abilities are used in order to analyze and practical abilities to transfer knowledge in practical terms.
Practical Intelligence

Practical Intelligence requires the use of contextual abilities, which are those used to succeed in everyday environments. In the school environment these abilities are used to comprehend and apply the “hidden curriculum” such as how to prepare for a test, how to interact with teachers, and peers and so on (Sternberg, 1994). Practical intelligence is used in the everyday environment and it is an ability which is considered necessary for succeeding in life, or even in the academic field. Practical abilities give insight into how to deal with someone who is difficult, how to interact in our environment, and how to use our knowledge in practical terms. When an individual learns knowledge material from the classroom, ideally the person would use his/her practical abilities to transfer such knowledge into his/her environment. One example given by Sternberg in his book *Successful Intelligence* is a young man who uses both his analytical and creative abilities, but lacks of any practical abilities. In consequence, this individual lacks the common sense on how to interact with people in his environment, and subsequently finds it hard to obtain or even keep a job (Sternberg, 1996).

Furthermore, Sternberg (1996) demonstrates in studies done in which cognitive abilities test and job performance are correlated, the average correlation between these two variables is only .2. As a result, when the level of validity is squared, only four percent of the variation among people in their job performance is explained by cognitive-ability test scores. However, the average correlation coefficient between cognitive-abilities and measures of performance in job training programs is .4. This indicates that individuals who are stronger in cognitive abilities will perform better when they are tested, but it does not necessarily translate into the work situation itself. Cognitive-ability
and measures of performance in job training programs are based on knowledge. Measuring cognitive abilities and measures of job performance are based on other factors, including practical abilities. This necessitates applying knowledge into the workplace job performance, where cognitive abilities are not to be used alone, but in relation with practical abilities.

Situations that involve practical abilities are a concern in our daily lives. In the classroom environment, the individual is given a problem and shown step by step how to solve it. In the real world, the problem presents itself, and the person must figure out how to fix it. Also, academic problems usually have one right answer. However, in everyday living there are many possible choices and outcomes (Sternberg, 1996).

As it can be observed, practical intelligence is a very important ability in the use and understanding of intelligence. It does not work independently of the other abilities but interacts with them. Problem solving is defined in analytical intelligence. However, the use and presence of creative and practical intelligence is of extreme importance in order to achieve the problem solving process. Thus, Sternberg’s *Triarchic Theory of Intelligence* can be briefly summarized:

- **Analytical**: the ability to analyze, judge, evaluate, compare, and contract.
- **Creative**: the ability to create, design, invent, originate, imagine.
- **Practical**: the ability to use, apply, implement, utilize, put into practice.

As stated by Sternberg, the three aspects of intelligence: analytical, creative and practical are viewed as distinct but not as independent, since they all depend on the same mental processes applied at different levels of experience and in different levels and kinds of contexts (Sternberg, 1994).
Sternberg has performed extensive research in order to assess his *Triarchic Theory of Intelligence* toward applying the findings in the classroom environment. In his first study conducted in the summer of 1992 at Yale University, Sternberg (1994) identified high school gifted students using the *Sternberg Triarchic Abilities Test*. The goal was to measure the three types of abilities, analytic, creative and practical. The purpose of the study was to investigate if the type of intelligence a student possessed would benefit or hinder his/her learning abilities when the individual was not in a learning environment that matched his/her particular intelligence. Students were chosen as high in one of the three types of intelligence, and some students were high on more than a single ability. The sample size was sixty-five students, composed of forty-three Anglo-American, six African-American, ten Asian, and six Hispanic-American. Thirty were female and twenty-five were male. Consequently, the students were equally divided among different sections of the study. All students participated in a general college-level course in psychology, which included a diversity of topics in this field. The text was developed by Robert J. Sternberg to emphasize analytical, creative, and practical thinking skills in relationship to the topics in psychology. Students attended morning and afternoon sections.

All students in the study received the same lectures and same text in the morning classes. However, in the afternoon sections students were placed in different classes. One section emphasized analytical thinking, another creative thinking, and the third, practical thinking. The analytical section concentrated on analyzing the validity of theories, comparing theories, and critiquing experiments. The creative section was guided to concentrate on student's abilities to come up with novel ideas for new psychological
theories and experiments built on past work. Last, the practical section was guided to elaborate on how to apply the concepts of psychology to everyday life.

Students were randomly assigned to the three treatment groups with the constraint that the three types of abilities were equally distributed among the three treatments. About one third of the students were placed in a section that matched their highest ability score, and about two thirds were placed in a treatment that did not match their ability. The results of the study confirm the theory that if students were placed in a section which matched their thinking abilities, the student did better in the course. Students who were high in creative ability and were placed in the section that reinforced creative thinking had the highest scores. The same results were found for the students who were high in practical abilities and were placed in that section. However, the same result was not found for the cognitive group. Speculation as to why the cognitive group did not score higher after being placed in a classroom that matched their abilities could be that such students rely too much on their past merits, and were less motivated to do well. Thus, it seems that placing students in an environment in which their thinking abilities are positively reinforced results in better performance (Sternberg, 1994).

Another study run at Yale University known as "Yale Summer Psychology Program" (1997) followed the same procedures as the study mentioned above. However, this time the students were divided into four groups:

- First group: based on memory abilities, such as recalling information
- Second group: analyzing, comparing, evaluating, judging or assessing.
- Third group: creating, inventing, imagining, supposing, or designing.
- Fourth group: putting into practice, implementing, or showing use.
The study was composed of 199 students. They were divided in five ability patterns: high analytical, high creative, high practical, high balanced (high in all three abilities), and low balanced (low in all three abilities). The results found in this study were very similar to those found in the study of 1992. One interesting finding was that the four high-ability groups differed in their racial, ethnic and socioeconomic composition. The high-analytical group was composed mainly of white, middle-to upper-middle-class students from well-known schools. The high creative and high practical groups were much more diverse racially, ethnically, socioeconomically, and educationally (Sternberg, 1997). As we can observe this indicates some environmental influence. First, we can observe that when the student was placed in a learning environment that matched his/her individual type of intelligence (e.g. high in creative intelligence), the student did better than when placed in a classroom that did not suit his/her type of intelligence. In addition, it was found that race, ethnicity, and socioeconomic status had an effect on types of intelligence (Sternberg, 1997) leading to conclude that the individual does not work independently from his/her environment.
Cognition and Environment

How exactly does the environment affect cognition is an issue that will be addressed in this chapter. Much research on cognition and the environment presents strong evidence suggesting that the individual does not work alone, and that cognitive abilities are influenced by persons and context.

According to Richard Snow's article (Sternberg & Wagner, Eds, 1994) *Abilities in Academic Tasks*, some forms of cognitive theory view cognition as situated. This refers to the structures and processes of knowing, understanding, reasoning, and learning. These activities are defined by relations between persons and tasks, or between persons, but they are not just located within the person's mind. Therefore, social constructions are not just limited to personality traits and abilities, but are extended to learning and reasoning processes (Lave & Wegner, 1991). According to Snow an interaction theory must take into account an individual person's predisposition and postdisposition in order to understand the person-in-situation.

In reference to the interaction theory, interaction exists when two independent variables are said to interact when their joint effect on a third, dependent variable is multiplicative rather than addictive. An interdependent interaction exists when two or more variables are said to be in an interdependent interaction when their effects can only be understood psychologically with respect to one another. For example, a task may be divided into difficult and easy, however, it is the individual doing the task who will find it either easy or difficult in regards to his/her own ability. The reciprocal interaction occurs when two or more variables act to change one another over time; e.g. an
individual can go within the same task from using one type of ability, such as verbal analysis to another such as spatial visualization.

According to the Transaction theory, variables are in constant reciprocal interaction. These variables have no relevant history or existence outside of the transactive system in which they are engaged; there is no cause-effect relations to be isolated, there is no previous relationship between both the task and the individual. However, this view has not been well supported by research. (Sternberg & Wagner Eds, 1994).

Further research points out that situation and previous experience influence each other. According to Lave and Wenger's (1991) Theory of Learning in Apprenticeships indicates that preexisting interpersonal or content structures could influence learning. Also, the outcomes of the transaction could adapt the participate framework in which later learning occurs. According to Greeno's (1989; Greeno, Smith & Moor, 1992) theory of transfer of situated learning, invariants in the structure of activities across person-situations are the key. Situations provide affordances for activities, and persons learn to engage in these activities but also to perceive the relevant affordances. Therefore, when two situations are presented to an individual, even though they may both be completely different, the individual can perceive the situation as providing the same activities; subsequently, the person transfers the information of one situation to another. As we can observe the individual works in relationship with the environment. In regard to the interaction theory the individual is exposed to a certain environment. Yet it is in the individual's own capacity and past experience that would yield a different result than that of another individual with different background. Also, it must be taken into
consideration that a person has the ability to transfer some of the information from one task to another, that is, the variables influence each other instead of taking away from the situation. Thus, environment and past experience is a part of the whole situation. The individual is not exposed to the situation without any previous knowledge or experience, even if it is small or perhaps irrelevant to the new situation. In relationship to this study, it helps us to understand that the type of intelligence an individual develops is in constant interaction with his/her environment.

Three individual studies: the concept of contingent tutoring from Wood’s (1980) studies of mothers teaching children, Bruner’s (1978) notion of scaffolding, and Vygotsky’s (1978) ideas about proximal development and the internalization of social interactions all agree that learning depends on one already understanding something of the nature of what is to be learned. According to these studies, an important function of teaching is to create links between the goal and context of a novel task and more familiar tasks, allowing the learner to apply skills and knowledge previously acquired. The tutor also controls those aspects of the task that is initially too difficult for learners, and permits them to concentrate upon and complete those aspects that each is able to perform. The tutor adapts the task demands and keeps them within each learner’s zone of proximal development. It helps the learner complete the task at hand, but also promotes the additional skill and strategy development that will enable the performance of similar tasks independently. The tutor effectiveness depends on this scaffolding being contingent upon the interaction of task demands and student performance. The more difficulty a student has with the task, the more directive the tutor. The greater the success of the
student on the task, the more the tutor encourages the student to work independently. (Snow, In Sternberg & Wagner, 1994).

Furthermore, Snow (1994) emphasizes that a new theory of intelligence should take into account that abilities are situated, and they are reflected in the running of particular persons to the demands and opportunities of the situation at hand. Thus, when the individual is confronted with a situation, it becomes an interaction between the individual and the situation, not just within the mind alone. The situation may provide some pieces for the task to be completed. However, the individual must be able to perceive and use these pieces, and also add pieces of information from his own personal history to accomplish the task.
Cognition and Context

Further research by Ceci and Bronfenbrenner (1985) investigates cognition and context. In their extensive research, they collected more evidence supporting the theory that context does influence a person's thinking abilities as well as how he/she transfers previous information, and knowledge to novel environments. In their study, children were asked to view a geometric shape on a computer screen, and decide where it would migrate on the screen. Children did much better when the geometric shape was changed to birds, butterflies, bees, and sounds, than when they were exposed to the geometric shape on the screen. When the geometric shape took the shape of birds, butterflies and so on, it resembled a video game. Children's predictions of where the object would migrate on the computer screen increased with the new setting, because it resembled a video game, an environment in which the children were familiar. In a later study (Ceci & Bronfenbrenner, 1985), ten year olds were given the video-game context, and then they were given the more complex geometric shape context. The purpose of the study was to see if the children would transfer their previous knowledge to the new environment. The results yielded that the children were able to transfer the knowledge of video game context onto geometric shape context only when there was relatively short time between one task and the other, and the children remain in the same (laboratory) room.

Ceci and Ruiz (1991) indicated how context is important in cognition, as well as in transfer of information and previous knowledge. In this study, two men who were experts at racetrack gambling and used a specific and complicated strategy to predict the outcome of the races were put into a different situation. However, this time it was in the stock market. Although, the strategy they would have to use would be equal to the one
they were using at the racetrack, both individuals was not able to transfer their knowledge into the novel context. Also, the I.Q of both individuals were taken into consideration. Although one had an I.Q of 125 and the other of 80 there was no difference as to how both persons transferred the information, for both were not able to do so. However, once the individuals were informed that they could use the same interactive term in this novel situation, they were able to transfer the knowledge.

As it can be observed previous experience has an impact on how information is transfer. In the mentioned study children were able to predict where the object would migrate when it was presented to them, in an environment with which they were already familiar. Therefore, it seems that when an individual is familiar with a certain environment, the person would do better than when presented with an environment which is very different to their previous experience. Further research on the effect of environment and learning is presented in the next section.
Mathematics and Practical learning

Extensive research has been conducted with Brazilian children and their ability to perform mathematical problems with a lack of formal schooling. Carraher, Carraher, and Schliemann's study (1985) of daily use of mathematics by young Brazilians, ages 9 to 15 years old, working in commercial activities continues to lead us to the conclusion that context predicts how the individual used his/her thinking abilities. Participants were children from poor migrant families who were street vendors. Their daily work required them to carry out mental arithmetic, such as subtraction, addition, multiplication, and even division. However, these children's academic background and knowledge was extremely limited. Most of them did not even reach fifth grade. Nonetheless, these children were capable of accurately calculating how much certain goods cost and how much change to give back, and so on.

These children were given an informal test in which real-life math questions had to be solved. The same children were given a test in which context-free math questions were to be answered. According to the study, the children answered approximately 98% of the questions correctly when given in their daily context, customer-vendor transactions. However, when taking the context-free test in which questions were asked in an academic manner, students correctly calculated only 37% of the math questions. Furthermore, in an intermediate level of context, there were Formal Test word problems. These word problems were more descriptive such as "If an orange costs 76 cruzeiros and a passion fruit cost 50, how much do the two costs together?" In this type of test format, participants correctly scored about 74%. Thus, the transfer is successful only when it is clearly indicated that the different contexts are indeed the same one.
Another study by Roazzi (1987) investigated the difference between 60 poor and middle-class Brazilian children, ages 6 to 9, in both the informal and the formal context. The group of poor children was composed of street-vendor children who unknowingly participated in the research during the normal course of customer-vendor interactions. In this part of the study the interviewer, posing as a customer, searched among the products the vendor had for sale (by the child). The investigator asked the child about two specific goods, chewing gum in two different flavors: mint and strawberry. The interviewer made sure that the child understood that there were two classifications, one subclass being what type of flavor the gums were, as part of a larger class, chewing gum. Then, the researcher proceeded to ask the child questions related to the goods, such as, “What type of chewing gum do you have?” “How much is this one?” and “Do I pay more for the mint chewing gum or the strawberry?” Thus, these children were taking part of the Informal test in a daily context in which they were familiar and necessary for their survival.

Later, these same children took the Formal test in which they were asked in an academic approach the same questions as when they were in the informal context. These included: “Are there more yellow balls or are there more blue balls”? In addition, the middle class children were tested in the same way as the lower-class participants. However, for the middle class children the Informal Test was called the Formal test 1, because for these children, the street-vendor context was not their daily context. Subsequently, the middle-class children were asked to pretend to be street-vendors, and the same questions were posed as those in the previous Informal Test given to the lower-class children. The results of the study indicate that there is a significant interaction
between social class and context; thus, differences between poor and middle-class children were found in each of the contexts. Lower class children performed better on the test which resemble their daily environment, and the middle class children achieved better scores on the formal test, since it resembled their academic environment.

As one can expect, the street-vendor children did significantly better in the Informal context than in the Formal context. Furthermore, the middle class children were more successful in the Formal context (academic approach). Also, it was noted that poor children did disproportionately better in the Informal context than middle-class children. As further stated by Ceci and Roazzi (1994) “context in which learning occurs has an enormous influence on cognition, by serving to instantiate specific knowledge structures, by activating context-specific strategies, and by influencing the subject’s interaction of the task itself. Neither context nor cognition can be understood in isolation; they form an integrated system in which the cognitive skill in question becomes part of the context” (Ceci & Roazzi, 1994).
Practical Learning in the environment

In this next section research shall be presented in order to understand the effects of adaptation to natural environment on cognitive and practical abilities.

The following passage which was found in Berry & Irvine’s article (1986, Sternberg & Wagner Eds) “Bricolage: Savages Do it Daily” emphasizes the idea that environment is critical in developing intelligence, and also how such it shapes our thinking abilities, in this case practical thinking. Referencing to Levi-Strauss who did extensive study with native people, the term bricolage is used, which refers to work of an odd-job sort. The worker, the bricoleur, is someone who works with his hands and uses devious means compared to those do the craftsman. Included is a quote from Gardner (1973) in which he describes the workings of a bricoleur:

"Faced with the task, of repairing a faulty machine, he (the bricoleur) looks over the materials at hand and improvises a solution. If the materials available do not suffice, he may try to modify them in some way; but he is unlikely to seek new tools or to redefine the problem. In contrast, the scientist or engineer will not even bother to determine what tools are available until a much later stage. Instead, he will refresh his knowledge of how the machine is supposed to work, drawing a diagram or even consulting a manual. Then, still proceeding on the plane of thought, he will specify the points at which something could have gone wrong, and the set of possible repairs. Only at this point will he inventory the tools that are at hand; and if the appropriate ones are missing, he will secure them, or if necessary, even invent them. As Levi-Strauss puts it, the bricoleur begins with the event- the broken machine and the tools available- and attempts to build a structure- a set of operations with the tools that will repair the damage. The scientist begins with the structure – his knowledge of the intact apparatus, his deductions about possible flaws- and then gradually converges upon the event – the specific tools and actions needed to repair the damage” (Gardner, 1973, pp. 139-140).
Gardner further states (1973) in explaining Levi-Strauss’s goal which was to indicate that the mind of the so-called primitive is no different than the mind of the member of an advanced Western culture. This seems to indicate that the mind of a so-called primitive is not really different from the mind of an advance Western culture member, that the difference between both individuals is not necessarily the level of intelligence, but rather how their abilities are used differently. The primitive person uses practical, and perhaps creative abilities rather than cognition to deal with his/her environment, whereas, a Western person uses his/her cognitive abilities in daily environment.

The following study presents how the environment is critical in the development of practical abilities. In a study conducted by Kearins (1976) with desert dwelling Australian Aboriginal children, she argued that basic survival would require the development of visual acuity for finding game and plants, and visual memory for patterns for retaining such information. A group of Aboriginal children were tested, as well as a group of European descent children. On the visual discrimination task, Aboriginal children outperformed the European children. Also, the Aboriginal children demonstrated a better performance on the visual memory task, a fact interpreted as support for the views that ecological engagement and experience can lead to differential ability development. (Berry & Irvine, 1986).

According to Berry and Irvine (1986) the implications of practical abilities for cognitive functioning must be understood in the terms of context, generality, and universality. Cross-culturally, behavior cannot be understood unless it is viewed in a functional context (ecological setting) in which it naturally occurs. The second issue asks
whether specific performances are linked together into patterns of cognitive activity, and if these patterns of ability are constant or variable across cultural contexts. Lastly, universality tries to investigate if all these behaviors, which are result of context, can be seen as one general view of cognitive functioning. Adaptability, a concept explained by Biesheuvel, states that the ability to handle novel problems and not just familiar daily problems would be a useful index of cognitive competence. (Berry & Irvine, 1986).

According to the research presented, as an individual adapts to his/her environment so are thinking abilities. Those abilities, which are more important to the survival would be more developed that those which are of little value to the environment in question. This research has been presented in order to understand how a child may be more likely to develop different types of thinking abilities according to the environment in which the child is exposed to on a daily basis. Thus, those children with less parental involvement would have to adapt to such environment, and would be more likely to develop those abilities which would be of aid in dealing with their daily activities. In addition as stated by Biesheuvel, adaptability would improve transfer of past knowledge onto new experiences.
Creativity and motivation

According to Amabile (1987) in her article *The Motivation to be Creative*, people are most creative when they are motivated by passionate interest in their work. This passionate work is called intrinsic motivation, the motivation to work on something because it is enjoyable, satisfying, challenging, or captivating. On the other hand, extrinsic motivation is the motivation to work on something because it is a means to an end, such as earning money, recognition, and so on. According to the intrinsic motivation hypothesis of creativity, intrinsic motivation leads to creativity whereas extrinsic motivation is detrimental. She also proposes that social factors in the work environment can influence intrinsic/extrinsic motivation, which in turn influences creativity. (Amabile, 1987). According to Amabile, intrinsic creativity is negatively influenced by extrinsic creativity, which she further explains as factors in the environment that enable the development of creativity such as time constraints, classroom rules, etc.

Furthermore, Amabile in her article (1987) points out another factor, which negatively influence creativity. In a study conducted by Lepper and colleagues (1973) the overjustification effect was demonstrated. A group of children from a nursery school participated in the study. These children had previously shown a high level of interest in playing with magic markers. Individually these children were asked to make a drawing with the magic markers. Some children were offered a reward when they were done; the other group of children was not offered such reward. The results of the study demonstrated that children who were promised a reward after their work was done spent less time on drawing than the other children. One of the possible explanations for this
behavior is the self-perception theory. In regard to this theory the children were aware that the reward was the goal of the task not the drawing, thus, losing interest in drawing. (Amabile, 1987).

However, Glucksberg’s (1962) study indicated that rewards could also increase the motivation for creativity. In this study, subjects were given a candle, a box of thumbtacks, and a book of matches, and were told to use only these materials in mounting the candle on a vertical screen. Those subjects that were promised monetary compensation if they got the job done took more time and finished the project compared to those who were not offered any type of reward.

Nonetheless, Amabile (1987) has conducted extensive research in which extrinsic motivation affects creatively negatively. One factor, which she points out, is evaluation by others, thus, fearing critiquing. Another factor negatively affecting creativity is being observed while the individual is working on a project. Furthermore, competition is seen as another variable that can cause creativity to decline, mainly in business environments where there are time constraints. In an experiment conducted by the author of the article to investigate competitiveness in creativity, findings indicated that competition did indeed lessen creativity. In this study forty-nine subjects participated. All of the participants received a booklet containing problems to be solved. However, at the front of the booklet there were two different instructions, one for each group. One group instruction was noncompetitive. The other group’s instruction was of competitive nature encouraging participants to be competitive against the other group. Those who received noncompetitive instructions did better than the group that was given the competitive instruction.
Restricted choice and time pressure are also mentioned as factors that can decrease creativity. One of the studies in restricted choice indicates such. A group of preschool-age children participated in the experiment. These children were divided in two groups: one group was given the choice of picking up to five tins to make a collage. In the other group the children were given the five tins to work with in order to make the collage. Those children that were given the opportunity to pick their own materials were judged higher in terms of their creative work than those who were given no choice. (Amabile, 1987).

The research presented seeks to understand how consequences and rewards in the environment have a great impact on the development of creativity. Thus, it would assumed that those children who are reinforced in their environment by using this type of abilities, may that be through the complexion of homework assignments, or another task, that they would be more likely to develop this type of ability.
Parental Involvement

Extensive research has been done in order to understand the relationship between parental involvement and a child’s academic achievement. In a study conducted by Deslandes and colleagues (1997) that investigated the influence of parenting style and parent involvement on school achievement at the secondary level indicates that such factors influence the adolescents’ school grades. The study was composed of 525 students in the ninth grade, 282 were girls, and 243 were boys in two different high schools in Quebec-Appalaches. School achievement was measured by school grades, as the dependent variable. Parenting Style was measured by three Likert scales developed by Steinberg (1992). The subscales correspond to the three factors of parenting style; warmth-acceptance, behavioral control, and psychological autonomy-granting. The warmth-acceptance parenting style indicates how the adolescent perceives his or her parents as loving, responsive, and involved. The second type of parenting style, behavioral control measures parental monitoring and supervision of the adolescent, such as being aware of child’s whereabouts. The last subscale, which assesses psychological autonomy-granting parenting style, measures how parents demonstrate democratic discipline and encourage the adolescent to express individuality with the family. Parent involvement in schooling was measured by a scale, which contained twenty parental involvement activities, at home and at school. The students took all of the above scales, thus, the measurements were based on the adolescent’s perception.

The results indicated that the students who view their parents as being firm, warm, involved, and democratic perform better at school than other adolescents. However, each parenting style individually was not found to be a strong factor in school
achievement, it is the combination of the three factors of parenting style, which seemed to be most beneficial. Parent involvement in schooling yielded two main results. A positive correlation was found between affective support and school results. A positive correlation was found for those students whose parents provide more affective support through praise, interest, and involvement and the students’ grades and motivation.

However, the other finding yielded a negative correlation between communication with the teachers and adolescents’ school grades. Greater contacts between school and home indicated lower grades. The speculation for this result is that these students are having problems at school, and parents are being informed more often. The final result of the study indicates that students who perceive their parents as being emotionally and instrumentally involved, with more monitoring of their whereabouts, and the liberty to express their individuality in the home environment, and have fewer contacts with teachers tended to have higher grades than their peers. (Deslandes, Royer & Turcotte, 1997).

Another study investigating parent-child relationship, home learning environment and school readiness indicates that parental involvement and home environment were predictors for the child’s school readiness (Parker, Boak & Griffin, 1999). Evidence suggests that greater parental involvement in children’s learning positively affects the child’s school performance. The study was composed of a group from the Head Start program. The Head Start program is offered to lower income families. These children are accepted into the program based on financial criteria.

The purpose of the program is that children from lower socioeconomic families will benefit from participating in this early program which seeks to prepare them for
entering a regular school environment at the age of five. The group consisted of 173
mothers, 99% of them were Latino, of whom most of them had immigrated from the
Dominican Republic. The term mother was not reduced to the biological aspect, but it
referred to the individual who was the main caretaker of the child. Two centers from an
urban city participated. The study used a pretest/posttest longitudinal design, from
September 1991 to June 1992. Parent-child relationship was measured using the Parental
Attitudes Toward Child Rearing Questionnaire. This scale seeks to assess for warmth,
encouragement of independence, strictness, and aggravation.

The home learning environment was evaluated by the National Evaluation
Information System, Part B. This scale assesses this factor by taking into account how
often the child helps at home, presence of educational toys at home, number of school-
readiness skills the parent has helped the child learn, how often the parent and child
participate in school activities, parent’s ability in teaching child, and
parents’understanding of play. Child school readiness was measured by child’s behavior,
the cognitive development, and adaptation to the classroom.

The results in the study found that an increased level of parental aggravation
predicted lower child school readiness, as well as higher classroom distractibility. Also,
increased parental strictness predicted lower classroom considerateness on the child’s
behavior, and correlated with higher classroom hostility and distractibility. Positive
findings were found in which an increase in parental understanding of play predicted
higher verbal intelligence as well as higher level of extroversion, creativity/curiosity, and
independence. An increase in parental ability to facilitate the child’s learning process
predicted higher independence. Furthermore, an increase in the frequency of the child
helping at home with household tasks predicted lower tasks orientation in classroom, higher disruption, and lower compliance. In summary, the study indicates that parental strictness, and aggravation had a negative impact on children's school readiness, and exhibited less sensory concept activation. On the other hand, warm, reciprocal parent-child interactions facilitate cognitive development. (Parker, Boak & Griffin, 1999).

The study of gender and parental involvement has not received quite as much attention. However, there are many reasons as to why this should be a more researched area. (Carter & Wojtkiewicz, 2000). According to gender role socialization, parents treat daughters and sons differently due to the patriarchal values of society, which promote males over females in the social order (Lober, 1994). As summarized by Cater and Wojtkiewicz other research has supported the evidence that sons receive more opportunities for personal autonomy and achievement than daughters (Eccles et al., 1990; Entwisle, Alexander, & Olson, 1994; Saltiel, 1985). Educational differences have also been found for gender difference. Parental expectations that males will do better in math and science and the belief that these courses are too hard for females are independent of academic achievement (Eccles et al., 1990). According to further research in math abilities and gender, it has been indicated that female students compared to male students have lower self-concepts concerning their mathematical ability (Wigfield & Eccles, 1994). In addition, there is a significant disproportion of the number of males who choose math-related fields compared to females (Catsambis, 1994). However recent reports from the U.S Department of Education indicate that females earn higher grades, are slightly more likely to graduate from high school, and enter and graduate from college at about the same rate as their male counterparts (Carter, Wojtkiewicz, 2000).
In a recent study of parental involvement and gender difference, it was found that involvement of fathers did not differ by gender of the child, but mothers were more involved with their daughters than with their sons (Bogenschneider, 1997).

The following study by Carter and Wojtkiewicz (2000) investigated parental involvement related to gender difference. The sample was composed of 25,000 randomly selected students from about 1,052 United States schools. The data came form the National Education Longitudinal Study using a nationally representative sample of students in public and private schools. Parental involvement was investigated while the adolescent was attending the eighth grade. Parental involvement was measured from the adolescents' perspective. The dependent variables were parental involvement with students' education; school discussion, parental expectations, parent-school connection, parental supervision, and parental attendance. The control variables to measured parental involvement were grades, test scores and educational aspirations. The results of the study indicated that female students engaged more frequently in school discussion with parents than did males. Also, it was found that daughters engaged more often in discussion of educational matters with their parents than did sons.

However, an interesting finding resulted in that parental expectations for educational achievement were higher for the females than the males. On the other hand, in regards to the effect of gender on parent-school connection, it was found that parents are more involved with the school on behalf of sons. Although, it was observed that parent's parental attendance at events in which the student participated was more likely for daughters than for sons. Lastly, parental supervision variables indicate that parents are less likely to check the homework of daughters as compared to sons. In summary, as
indicated by this study daughters received more attention from their parents than did sons on four of the seven measurements of involvement, net of academic factors. It must be noted that although there was evidence of greater parental involvement with daughters than sons, the measurements did not seek to assess for parental motivation. (Carter & Wojtkiewicz, 2000).

Throughout the introduction evidence has been presented in order to explain how the mind interacts with the environment, and how all types of abilities in the human mind are affected by the environment and the reinforcements received from such the situation in context.
Method

Participants

Eighty-five subjects from a local high school participated in the study. The study used 47 males, and 38 females. The mean age was 17.27. Although, ethnicity was not taken into account in the study, over 75% of the students were Caucasian. The students were asked to participate by their teacher. Involvement in the study was completely voluntary and the students had the choice not to participate. Some students in the classroom decided not to be part of the research. However, a vast majority chose to do so. The students were given an informed consent explaining the study and the possible risks, which were minimal. They were also informed that they could exclude themselves from the study at any moment.

Design

This study seeks to measure the relationship between perceived parental involvement and performance on Sternberg’s Triarchic Theory of Intelligence. A Parental Involvement Scale was given to measure how involved parents are from the perspective of the students. Students were asked to complete the scale and give a measure in accordance to parental involvement. The scale was rated from 1 to 5, Never to Always. How I Learn Scale, was administered in order to measure whether students relied on themselves or external factors for school assignments. This also seeks to measure for parental involvement. The scale consists of fourteen questions measuring both internal
and external factors. The *Parental Involvement scale* was used as the independent variable and *How I Learn Scale* as the dependent variable.

*Parental Involvement scale* was used as the independent variable, and *Sternberg's test* as the dependent variable. The study investigated whether parental involvement had any effect on each type of intelligence, e.g. "*Do students who get greater parental involvement do better at cognitive intelligence?*" and "*Are students who have lesser parental involvement better at practical intelligence?*" In addition, *How I Learn Scale* was used as the independent variable and the three different types of intelligence scores from the *Triarchic Abilities Test*. Furthermore, we used parental involvement as an independent variable and gender as the dependent variable. Also, gender was used as the independent variable and performance on *Sternberg' Abilities Tes* as the dependent variable.

**Materials**

**Parental Involvement Scale**: This scale was created by the author (See Appendix A) in order to measure parental involvement with the students at school, and with academic activities. Questions were answered from the perspective of the student. There were a total of eight questions, rated 1 for never, to 5-always. These questions included activities in and outside of the school, such as reading, playing table games, and sports as activities outside of the academic area. Questions referring to school activities were such as: "*Do your parents help you with homework?*" "*Does your parent attend PTA meetings?*". The greater the score on the scale, the increased perceived parental involvement. Also included in this scale were three questions asked for demographic purposes: the student's age, gender, and g.p.a.
How I Learn Scale: Kern and Coates (1986) developed this scale to measure adolescent perceptions of achievement support. According to Kern and Coates, the term "achievement support" refers to the interpersonal and structural resources available to encourage further education and achievement goals in the adolescent. Achievement supports can be considered to include verbal and emotional encouragement and rewards. (See Appendix B). The scale consists of two subscales. One subscale seeks to measure student resources and student initiated behavior, such as requesting help. The other subscale measures external resources from parents or others in the environment, such as availability to obtain books, or answer concerns about school. This scale was based on the structured alternative format, originated by Harter (1982) in order to reduce the problem of students answering for social desirability. Each of the fourteen questions is presented with pairs of opposing statements regarding either the student initiated behavior, which facilitates learning, or external resources. The students were asked to select one of the statements that best describes them or their present situation, and to rate the selections as "really true" or "sort of true".

Questions concerning student resources are 1, 5, 2, 6, 10, & 12. These questions seek to measure initiated student behavior. The higher the score, the greater the initiated behavior by the student such as asking for help with homework, and doing tasks on their own. Questions that seek to measure external resources are: 3, 7, 9, 11, 13, 4, 8, & 14. These questions assessed the availability of external factors in the environment. Also, a greater score on this subscale implies more support from the environment, such as help from parents with homework, and other resources that may facilitate learning such as
libraries, books, and computers, etc. The higher the score on the scale, the greater the number of achievement support resources perceived to be by the student.

**Sternberg's Abilities Test, Level H:** Dr. Robert Sternberg (1993) developed this test that consists of nine multiple choice parts, thirty-six questions in total, which seek to measure the three types of Intelligence: Analytical, Creative, and Practical (See Appendix C). It also includes a set of three essay questions, however, this test was modified for the study. The students were not asked to take the essay portion due to time limitations in the classroom. Thus, only the multiple-choice questions were administered. The maximum score for each of the analytical, creative, and practical multiple-choice sections was 12. This portion of the test takes approximately forty-five minutes to complete.

The test yields three basic scores: Analytical (subtests 1-3), Creative (subtests 4-6), and Practical (subtests 7-9). In addition separate scores can also be obtained for: Verbal (subtests 1,4,7), Quantitative (subtests 2,5,8), and Figural (subtests 3,6,9).

An example of a cognitive question in *Sternberg's Triarchic Abilities test* is the following:

The vip was green, so I started to cross the street.

*Vip* most likely means.

A. car  B. sign  C. light  D. tree.

The correct answer is C. light.

An example of a creative question in *Sternberg's Triarchic Abilities test* is the following:

Linda was awarded a scholarship for college that covers all of her expenses except books and supplies. She expects that she will need approximately $1000 per year. Being
financially independent is of utmost importance to her. Which solution is most likely to give her the money she needs and still remain financially independent?

A. Use the money she hopes to receive from graduation gifts instead of spending it on new clothes for college.

B. Tell her summer employer that she will work the extra hours offered to earn the money she will need.

C. Take out a student loan.

D. Borrow the money from her parents.

The correct answer is B.

An example of a practical question in Sternberg’s Triarchic Abilities Test is the following:

Money falls off trees. Snow is to shovel as dollar is to

A. bill

B. rake

C. bank

D. green

The correct answer is B.

Procedure

Participants were first given an informed consent, and then asked to read it thoroughly and ask any questions they might have regarding the study. Next, students were asked to fill out the Parental Involvement Scale, which contained a brief questionnaire. It requested information about their age, g.p.a, and gender.
In addition, the students were administered the *How I Learn Scale*. Subsequently, students were given *Sternberg’s Triarchic Abilities Test*, which took the students approximately one hour to complete.

The students were asked to write the same number on each one of the scales and test in order to keep the data linked with the student (the number would be the same for each student, for example, a student was given the number 1 which would have to be written on each portion). However, the only known information about the participant was age, gender, and g.p.a.

Participants took approximately one hour and fifteen minutes to take the test and the scales. The participants were read a debriefing telling them about the study.
RESULTS

Analysis #1

The first hypothesis was that students with lower parental involvement would score higher on the practical subtest of Sternberg's Triarchic Abilities Test, and those students with higher parental involvement would score higher in the cognitive subtest. Parental Involvement was used as the independent variable; it was divided in three groups: high, medium, and low parental involvement. Performance on each subscale of Sternberg's Triarchic Abilities Test was used as the dependent variable: cognitive, creative, and practical. A One way ANOVA was used to study for this effect.

A significant result was not found for parental involvement and cognitive subscale the means are, \( M_1 = 5.75 \) (\( SD = 2.75 \)) for low parental involvement. \( M_2 = 5.76 \) (\( SD = 3.12 \)) for medium parental involvement. \( M_3 = 4.96 \) (\( SD = 2.05 \)) for high parental involvement, with an Overall \( F(2,82) = .802, p. = .452 \).

Parental involvement and creative subscale also did not yield any significant results. The mean for low parental involvement was 5.75 (\( SD = 2.51 \)). The mean for medium parental involvement was 5.24 (\( SD = 2.12 \)). The mean for high parental involvement was 4.75 (\( SD = 2.59 \)). \( F(2,82) = 1.129, p. < .328 \).

Parental involvement and practical subscale did not yield significant results. The mean for low parental involvement was 4.92 (\( SD = 2.69 \)). The mean for medium parental involvement was 4.52 (\( SD = 2.02 \)). The mean for high parental involvement 4.11 (\( SD = 2.02 \)). \( F(2,82) = .856, p. < .429 \). Therefore, a relationship between parental involvement and Sternberg's Triarchic Abilities test was not found.
Analysis #2

A second hypothesis was that those students who score high on the parental involvement scale (created by the author) would score high on the How I Learn Scale, since both scales seek to measure parental involvement, or support from the environment. To study the effects of parental involvement and the How I Learn Scale used in the study, a One-way ANOVA was run. Parental Involvement scale used as the independent variable, was divided in three groups: low, medium and high. The dependent variable was the overall score on the How I Learn Scale.

A One-way ANOVA between Parental Involvement scale and How Learn Scale yielded a significant difference in means, overall F (2, 82) = 11.113, p < .001. The mean for low parental involvement was 36.97 (SD = 8.85). The mean for medium parental involvement was 39.91 (SD = 5.14). The mean for high parental involvement was 45.14 (SD = 5.79). The greatest mean was found in the high group for parental involvement, a mean of 45.143, thus, indicating that students who perceive more parental involvement are more likely to initiate their own behavior in regards to school, and to use resources in their environments which facilitate learning.

Since the How I Learn Scale was broken down into two subscales, internal and external subscales, further analyses were run in order to understand which one of the subscales was more affected by parental involvement. Therefore, a One-way ANOVA between parental involvement and each of the subscales of How I Learn Scale was run. Parental Involvement Scale was used as the independent variable and the Internal subscale as the dependent variable. This yielded an overall F(2, 82) = 11.761, p < .001. The mean for low parental involvement was 14.25 (SD = 4.18). The mean for medium
parental involvement was 15.45 (SD = 2.93). The mean for high parental involvement was 18.39 (SD = 2.51). The greatest mean was found in the high parental involvement which would indicate that the students who perceive high parental involvement were more likely to seek help in their environment.

A One-way ANOVA between *Parental Involvement Scale* and the external subscale yielded a significant difference in means, $F (2, 82) = 4.403$, $p < .015$. The mean for the low group was 22.83 (SD = 6.05). The mean for the medium group was 24.12 (SD = 4.43). The mean for the high group was 26.82 (SD = 4.65). The greatest mean was found in the high group of the *Parental Involvement Scale*. This indicates that students who score highest in the *Parental Involvement Scale* are more likely to receive help from their external environment, such as access to computers, libraries or third persons.

**Analysis # 3**

The next study sought to investigate if gender had an effect on the factors used in this study. An independent t-test was used to analyze gender, as the independent variable, and *Parental Involvement Scale*, as the dependent variable. The higher the score on this scale, the greater the parental involvement. We were trying to investigate if there is a difference in means in how involved parents are in relationship to gender. A significant main effect for difference in means in gender and parental involvement was found. The means for males was 19.23 (SD = 6.02). The means for females was 21.93 (SD = 6.12), $t_{(80)} = -2.016$, $p < .05$, thus, indicating that females perception of parental involvement is greater than males.

Subsequently, gender was used as the independent variable, and *How I Learn Scale* as the dependent variable, in order to see if a difference in means existed between
the perceived help females and males receive from their environment. An independent t-test indicated a significant difference in means. The means for males = 39.47 (SD = 5.48). The means for females = 43.57 (SD = 5.65), t(80), p < .05, indicating that females are more likely to seek help in their environment, or report this, and therefore receive such help than males are.

Since *How I Learn Scale* consists of two subscales, internal and external scale, further analyses were performed in order to investigate the two: gender as the independent variable and internal scale as the dependent variable. An Independent t-test was run between gender and the internal subscale. It yielded a significant difference in means: The mean for males was = 15.17 (SD = 3.11). The means for females was = 17.69 (SD = 2.73), t(80) = -3.814, p < .001. This shows that females more likely to report that they initiate their own behavior, such as asking for help in their homework than are males.

An Independent t-test in regards to the external subscale and gender did not yield a significant difference in means: the means for males was = 24.30 (SD = 4.41). The mean for females was = 26.06 (SD = 4.32), t(80) = -1.801, p < .076.

**Analysis # 4**

A further analysis investigated if gender had an effect on the overall scores for *Sternberg's Triarchic Ability Test*. Gender was used as the independent variable, and Sternberg's test as the dependent variable. An independent t-test yielded a difference in means. The mean for males was = 16.23 (SD = 6.30). The means for females was = 13.80 (SD = 4.71), t(80) = 1.919, p < .059. It can be observed that there is a trend for males to perform better than females on this test.
Since, Sternberg's Test was divided in three subtests, further analysis was run to investigate if gender had an effect on the three different abilities: cognitive, creative and practical. An independent t-test analysis was run to see if there is a difference in means for the three types of intelligence. The independent variable was gender, and the dependent variable was the score for each of the subscales.

Mean for males for the cognitive subscale was 6.13 (SD = 2.77). Means for females for the cognitive subscale was 4.74 (SD = 2.44), t (80) = 2.353, p < .05. This indicates that males tend to scored better than females in the cognitive subtest.

The means for males in the creative subscale was 5.38 (SD = 2.53). The means for females in the creative subscale was 5.17 (SD = 2.26), t (80) = .392, p < .696. As it can be observed a difference in means was not found for the creative subscale when gender was used as the independent variable. Therefore, gender did not have an effect on scores on the creative subscale.

The means for males in the practical subscale was 5.00 (SD = 2.31). The means for females = 3.91 (SD = 2.03), t (80) = 2.212, p < .05. These results indicate that males scored higher on the practical subtest than females.

Analysis #5

This analysis seeks to investigate the means on Sternberg’s Abilities Test for gender independently. A One-way ANOVA was run to study this effect. Parental involvement (high, medium and low) was used as the independent variable, and scores on Sternberg’s subtest as the dependent variable. Although, the analysis was not significant, the means are reported.
The means for males for the cognitive subtest and parental involvement as the independent variable yielded the following. The mean for low parental involvement was 5.89 (SD = 2.69). The mean for medium parental involvement was 6.82 (SD = 3.23). The mean for high parental involvement was 5.21 (SD = 2.12), F (2/47) = 1.349, p < .30. The highest mean was found in the middle parental involvement range. This states that those students who receive, or report receiving medium parental involvement did better on the cognitive subtest.

The means for the creative subtest and parental involvement as the independent variable were for low parental involvement 5.63 (SD = 2.71), the mean for medium parental involvement 5.41 (SD = 2.40), and the mean for high parental involvement 4.57 (SD = 2.41). F (2/47) = .756, p < .48. The highest mean was found for low parental involvement. Those students who reported less parental involvement scored higher on the creative subtest. The means for practical subtest and parental involvement, low parental involvement was 5.58 (SD = 2.43). The mean for medium parental involvement was 4.76 (SD = 2.44). The mean for high parental involvement was 4.14 (SD = 1.66). F (2/47) = 1.692, p < .20. The greatest mean was found for low parental involvement, which indicates that those students who reported less parental involvement did better on the practical subtest. These findings, although small, support the hypothesis that less parental involvement increases performance on the creative and practical subtest.

A One-way ANOVA for parental involvement as the independent variable and scores on the Sternberg's subtest for the female population was run. Although, the analysis was not significant, the means are reported.
The means for females for the cognitive subtest and parental involvement as the independent variable yielded the following. The mean for low parental involvement was 5.50 (SD = 3.02). The mean for medium parental involvement was 4.44 (SD = 2.57). The mean for high parental involvement was 4.71 (SD = 2.02), F (2/35) = .053, p < .95. As opposed to the male population, the greatest mean was found for low parental involvement. This indicates that those students who reported less parental involvement, scored higher on the cognitive test.

The means for the creative subtest and parental involvement as the independent variable were for low parental involvement 5.83 (SD = 1.72), the mean for medium parental involvement 4.83 (SD = 1.89), and the mean for high parental involvement 4.93 (SD = 2.84). F (2/35) = .416 p < .663. The greatest mean was found in the low parental involvement, which indicates that those students who reported less parental involvement did better on the creative subtest. The means for practical subtest and parental involvement, low parental involvement was 2.67 (SD = 2.07). The mean for medium parental involvement was 4.11 (SD = 1.45). The mean for high parental involvement was 4.07 (SD = 2.40). F (2/35) = 1.365, p < .269. However, the greatest mean was found in the high parental involvement. This indicates that those students who reported high parental involvement performance better on the practical subtest.

The findings for the female sample does not support the hypothesis, since females’ scores were decreased on the cognitive subtest when higher parental involvement was reported, and increased on the practical subtest when more parental involvement was reported. The findings do not seem to be very consistent for the female sample.
DISCUSSION

The purpose of this investigation was to study if a relationship is present between parental involvement and Sternberg's Triarchic Theory of Intelligence. The study investigated previous research in terms of mind in context, creative intelligence, and practical intelligence. As we have observed cognitive intelligence is important in utilizing those abilities which are necessary for problem solving and analyzing. However, in examining the steps of problem solving, it is apparent that such ability is not used independently of other processes in the mind. An individual may be able to break down a problem, analyze it, and still not be able to solve it nor understand the conflict at hand. This is when creative and practical abilities come into place. Since creativity is considered a novel way of approaching a task, then it can be understood that an individual who is strong in creative abilities may be more likely to analyze the problem from a totally different perspective where previously results were not obtained. On the other hand, practical ability is just as necessary to solve the problem. Once an individual has figured out the reasons, or causes of a problem, he/she needs to utilize the practical ability in order to infer the knowledge to practical terms.

Therefore, the main concern in investigating parental involvement and Sternberg's Triarchic Theory of Intelligence seeks to understand what factors influence an individual's intelligence. As previously stated, Sternberg's Triarchic Theory of Intelligence includes the main domains: cognition, creativity and practical abilities. The question that remains is what factors in the environment affect these type of abilities?
This is the main question that this study has sought to address which may lead towards a better understanding of factors that may influence these types of abilities.

The main purpose of the study was to see if parental involvement had an effect on the performance on Sternberg’s Abilities Test, whether lesser parental involvement increased practical and creative scores. In the study it was found that parental involvement did not have an effect on the scores on Sternberg’s Abilities Test. Yet, we were not able to determine this finding from this study. Nevertheless, it was detected that females reported more parental involvement than males. Whereas, the reason for this finding could be that females are more likely to report parental involvement, or that they are more likely to seek help than males are. From a cultural perspective males are taught to be more independent than females. Furthermore, when comparing the means for females and males on Sternberg’s Abilities Test and its subtests (cognitive, creative and practical), it was found that males did better than females on the cognitive and practical subtests. Although this supports, to some extent, the hypothesis that less parental involvement would increase creative and practical scores, the difference in means was not very significant.

It was the hypothesis that less parental involvement would increase practical abilities. Therefore, we would expect higher scores on the practical subtest for those students who reported less parental involvement. According to this hypothesis, children who receive less help from their parents with homework or other daily tasks would have to rely on themselves to accomplish such. Therefore, when there is a lack of guidance from the environment the individual would learn to find, or obtain the resources necessary to deal with the problem at hand.
It is my hypothesis that when an individual receives help from parents, or caretakers, such as with homework, the child is taught step by step how to accomplish the task, thus, reinforcing cognitive abilities.

The study yielded some significant results supporting the hypothesis that less parental involvement would increase scores on the practical subtest. Males scored higher on the practical subtest than females. Yet, it was also found that males scored higher than females on the cognitive subtest, which contradicts the hypothesis that less parental involvement would have a significant impact on cognitive abilities. Furthermore, cognitive abilities are heavily reinforced in the academic environment, which could explain for this finding.

Unfortunately, there was not enough evidence to indicate that parental involvement had an effect on the three types of abilities. Limitations in this study could have been responsible for this result. The sample size was not very large, since only eight-five students participated. Also, there was not enough diversity in the study. Most of the students were middle class adolescent and of Caucasian ethnicity. It could be assumed that the students’ motivation to fully answer the questionnaires, and test could have been decreased, since they did not receive any type of positive reinforcement. The study was conducted during class hour, and students did not receive any extra credit. Another limitation to the study is the age of the sample. Students in high school may be less prone to report parental involvement, or perceive their parents as involve since they are more likely to be seeking to establish their independence. In addition, parents did not participate in the study. Therefore, it could not be investigated if parents’ perception of involvement differ from the students’ perception of parental involvement.
Another consideration is regarding *Sternberg's Abilities Test*, in which there is still some question as to whether this test does indeed measure for these abilities: creative and practical. In a closer look at the test, one could argue that the test is not measuring those abilities. Since all of the questions on the test use cognitive abilities, it could be argued that in order to measure for creative and practical abilities, different questions or problems should be include. Creative questions could be included in which an individual is presented with a problem or situation in which the person must find a novel way of solving the problem. In the same regard, it should be presented for practical abilities, such a practical problem in which this type of ability is required. It should be noted that in order to measure for creative and practical abilities, questions which are only created to measure these abilities may be a stronger prediction for measuring these abilities.

Although it was been reported that parental involvement increases student’s success in the academic environment, little research has been done in order to understand if a decrease of parental involvement can affect an individual’s creative and practical abilities. It is my suggestion that more research should be done in this area in order to investigate the possible factors that could be responsible for those types of abilities. As we have observed in this study practical and creative abilities are as important as cognitive abilities, therefore, their importance in the academic and daily living environment should not be underestimated.

Recommendations for future research in this area would be to include the perception of parents in their involvement with their children. Also, a larger and more diverse (socioeconomic status and ethnicity) should be considered. Age may have been a factor, and children from a younger population, such as junior high may be more reliable,
since they might be more likely to report parental involvement than older students. Also, time limitations could have been a problem in the study, and thus, the study should be divided in a couple of sessions, one for the students to answer parental involvement scales, and another section for the students to take the test measuring the abilities.

Further research should be undertaken in order to understand what specific factors in the environment could influence these types of thinking abilities. Questions are raised as to whether it is indeed lack of parental involvement which leads to increased level of practical ability development or if it is simply an adaptation process related to socioeconomic factors and the lack of environmental supports available to adolescents. When children are exposed to an environment in which there is a lack of guidance or resources, the child will have to learn to adapt to such environment. Evidence has been presented in the study, which demonstrates adaptation to the environment is essential for humans. In addition, the process of adaptation to the environment requires the development and usage of those mental abilities, which would be the most beneficial to the environment in question. Therefore, it is should be kept in mind that an individual works in constant interaction with the environment. The mind is not an independent entity without regard to its surroundings, it is affected and shaped by all experiences that the individual is presented with on a daily basis. Thus, an individual is the sum of all the experiences that a person has been presented with in his/her life.
Appendix A

*Parental Involvement Scale*
Student Questionnaire:

Please answer these questions as accurately as possible:

GPA__________  Sex ______  Age_____

1. Does your parent help you with your homework?
   Never  1  Seldom  2  Sometimes  3  Often  4  Always  5

2. Has reading been a shared activity for you and your parent?
   Never  1  Seldom  2  Sometimes  3  Often  4  Always  5

3. Do your parents attend "Parents and Teachers meetings"?
   Never  1  Seldom  2  Sometimes  3  Often  4  Always  5

4. Do you and your parents play games together?
   Never  1  Seldom  2  Sometimes  3  Often  4  Always  5

5. When your parent helps you with homework, does your parent explain with detail?
   Never  1  Seldom  2  Sometimes  3  Often  4  Always  5

6. Does your parent meet teacher to discuss your progress?
   Never  1  Seldom  2  Sometimes  3  Often  4  Always  5

7. Is either of your parents involved in sports activities with you?
   Never  1  Seldom  2  Sometimes  3  Often  4  Always  5

8. Do your parents watch television with you?
   Never  1  Seldom  2  Sometimes  3  Often  4  Always  5
Appendix B

*How I Learn Scale*
How I Learn Scale

Directions: The items on the following pages will help us understand some ways by which you may learn. People learn things in different ways. Therefore, there are no right or wrong answers.

1. First, go to number 1. You will see two descriptions near the center of the page, which are separated by the word, “but”. Read these two descriptions.
2. Decide which description is most like you, the one on the right or the one on the left side of the word, “but”.
3. Then decide whether the description you chose is really like you or sort of like you and make an X in the space underneath either the “Sort of True for me” or “Really True for me” column.
4. Be sure to pick only one description that best fits you and mark an X in only one space, to show how much that description is like you for each numbered item.

For example:

<table>
<thead>
<tr>
<th>Really true</th>
<th>Sort of true</th>
<th>Really true</th>
</tr>
</thead>
<tbody>
<tr>
<td>For me</td>
<td>for me</td>
<td>for me</td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Some kids often study. But Others kids never study.

If you only study occasionally you would place an X in the “Sort of True” column.

<table>
<thead>
<tr>
<th>Really true</th>
<th>Sort of true</th>
<th>Really true</th>
</tr>
</thead>
<tbody>
<tr>
<td>For me</td>
<td>for me</td>
<td>for me</td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Some kids do their homework on their own. Other kids need to be reminded on their own. But.

<table>
<thead>
<tr>
<th>Really true</th>
<th>Sort of true</th>
<th>Really true</th>
</tr>
</thead>
<tbody>
<tr>
<td>For me</td>
<td>for me</td>
<td>for me</td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Some Kids do not ask for help when they have problems with homework. Other kids ask for help when they have problems with homework. But.
Really true  Sort of  Sort of true Really true  Sort of true Really true
For me  true for me  true for me  true for me  true for me

3. ____________________________  ____________________________  ____________________________
Some kids get help from their Parents with homework.  Other kids get no help from But their parent with homework.

Really true  Sort of  Sort of true Really true  Sort of true Really true
For me  true for me  true for me  true for me  true for me

4. ____________________________  ____________________________  ____________________________  ____________________________
Some kids have no place at home to study  Other kids have a place at home to study

Really true  Sort of  Sort of true Really true  Sort of true Really true
For me  true for me  true for me  true for me  true for me

5. ____________________________  ____________________________  ____________________________  ____________________________
Some kids enjoy going to Museums to learn new things.  Other kids do not enjoy going But to museums.

Really true  Sort of  Sort of true Really true  Sort of true Really true
For me  true for me  true for me  true for me  true for me

6. ____________________________  ____________________________  ____________________________
Some kids are not sure of What they want to be when They grow up.  Other kids know what they But they grow up.

Really true  Sort of  Sort of true Really true  Sort of true Really true
For me  true for me  true for me  true for me  true for me

7. ____________________________  ____________________________  ____________________________  ____________________________
Some kids have things (i.e. encyclopedia, other books, computer, etc.) at home that help them learn.  Other kids do not have things at home that help them learn.  But

Really true  Sort of  Sort of true Really true  Sort of true Really true
For me  true for me  true for me  true for me  true for me

8. ____________________________  ____________________________  ____________________________
some kids do not know anyone personally who has gone to college.  Other kids know someone personally who has gone to college.  But

54
Really true  Sort of  Really true
For me true for me for me
9. 
Some kids’ parents want them to attend college
Other Kids’ parents want them to do something else
them to attend college
After high school. But high school.
Really true  Sort of  Really true
For me true for me for me
10. 
some kids seldom visit the library. But other kids visit the library often.
Really true  Sort of  Really true
For me true for me for me
11. 
Some Kids have a place besides home where they can get help with schoolwork. But other kids have not other place
where they can get help with school work.
Really true  Sort of  Really true
For me true for me for me
12. 
Some kids are happy just to get by in school. But other kids have a strong desire to do well in school.
Really true  Sort of  Really true
For me true for me for me
13. 
Some kids know an adult besides their parents whom they can talk to about school and future plans. But other kids do not know an adult besides their parents whom they can talk to about school and future plans.
Really true  Sort of  Really true
For me true for me for me
14. 
some kids do not belong to a club or organization at school or in the community (e.g. church choir, scouts, band, etc.) But other kids belong to a club or organization at school or in the community.
Appendix C

Sternberg’s Triarchic Abilities Test
Part 1
DIRECTIONS

Each passage contains an unknown word that is underlined. Read each passage and choose the word that has the same meaning as the unknown word as it is used in the question.

On your answer sheet, write the letter corresponding to the answer you choose.

Please do NOT write on the test booklet.

SAMPLE A

The vip was green, so I started to cross the street.

Vip most likely means
A. car  
B. sign  
C. light  
D. tree

SAMPLE B

The day was hot, and many people were outside enjoying the sunshine. Many tems were on the lake. Some pulled water-skiers.

Tem most likely means
A. wave  
B. boat  
C. raft  
D. duck
Part 2
DIRECTIONS

Each question contains a series of numbers. Each number in the series is related to one or more of the numbers before it by some rule. Find the rule, and figure out what number should come next in the series.

On your answer sheet, write the letter corresponding to the answer you choose.

Please do NOT write on the test booklet.

SAMPLE A

<p>| | | | | |</p>
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<tr>
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<tbody>
<tr>
<td>12</td>
<td>16</td>
<td>20</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

A. 30  B. 28  C. 26  D. 22

SAMPLE B

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

A. 1  B. 4  C. 5  D. 6

1.

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<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>10</td>
<td>19</td>
<td>31</td>
<td>46</td>
</tr>
</tbody>
</table>

A. 61  B. 68  C. 64  D. 77

2.

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</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>13</td>
<td>21</td>
</tr>
</tbody>
</table>

A. 26  B. 29  C. 34  D. 33
Part 3
DIRECTIONS

In each question, the shapes in the top row of boxes go together in a certain way. Choose the shape that goes with the shape in the bottom row in the same way that the shapes in the top row go together.

On your answer sheet, write the letter corresponding to the answer you choose.

Please do NOT write on the test booklet.

SAMPLE A

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
</tbody>
</table>

SAMPLE B

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
</tbody>
</table>

1.
DIRECTIONS

You are Joey, the advice columnist for your high school newspaper. Each question is about a situation that a high school student may encounter. Read each question carefully, and choose the answer that provides the best solution, given the specific situation and desired outcome.

On your answer sheet, write the letter corresponding to the answer you choose.

Please do NOT write on the test booklet.

SAMPLE A

Dear Joey,

I was awarded a scholarship to college for next year. It covers all my expenses except books and supplies, which I think will cost about $1000 per year. I really want to be completely financially independent, so how can I be independent yet still get the money I need?

Signed,
Broke and on my own

Dear Broke,

You can

A. use the money you hope to receive from graduation gifts instead of spending it on new clothes for college.

B. get a summer job and be willing to work as much as possible.

C. take out a student loan.

D. borrow the money from your parents.

SAMPLE B

Dear Joey,

I moved here 2 months ago from Arizona. I don’t have any friends in my new high school. I’m lonely and bored. I’m interested in lots of activities such as writing. What do you suggest I do?

Signed,
Lonely and bored

Dear Lonely,

You could

A. volunteer to work on the school newspaper staff.

B. spend time at home writing columns for the school newsletter.

C. try to convince your parents to move back to Arizona.

D. invite a friend from Arizona to visit during the winter vacation.
Part 5

Each question asks you to use information about everyday things. Read each question carefully and choose the best answer.

On your answer sheet, write the letter corresponding to the answer you choose.

Please do NOT write on the test booklet.

D : $5
C : $10
B : $15
A : $20
FIELD
ROWS 1-10
ROWS 21-30
ROWS 31-100

SAMPLE A

Because seats were selling out, Jason and his brother purchased tickets in Section A, and their parents purchased seats in Row 25. How much did the four tickets cost altogether?

A. $40
B. $50
C. $60
D. $90

SAMPLE B

Mike wants to buy two seats together and is told there are pairs of seats available only in Rows 8, 12, 49, and 96. Which of the following is not one of his choices for the total price of the two tickets?

A. $10
B. $20
C. $30
D. $40
SAMPLE A

You are at the Burger Stand. You want to go to the front of the Ticket Sales to meet some friends. If you walk the shortest way, you will past the entrance to the

A. Lemonade Stand and Computer Games Arcade
B. Music Hall and Wild Animal Show
C. Music Hall and Soft Drink Stand
D. Monkey Show and Wild Animal Show

SAMPLE B

You walk from the Lemonade Stand to the Computer Games Arcade. Your friend walks from the Shooting Gallery to the Roller Coaster. Which of these will BOTH of you most likely pass?

A. Merry-Go-Round
B. Music Hall
C. Pizza Stand
D. Dog Show
Part 7
DIRECTIONS

In each question below, there are three underlined words. The first two underlined words go together in a certain way. Choose the word that goes with the third underlined word in the same way that the first two go together.

Each question has a "Pretend" statement. You must suppose that this statement is true. Sometimes the statement will be important in helping you choose the correct answer and sometimes it will not. Think of the statement, and then decide which word goes with the third underlined word in the same way that the first two underlined words go together.

On your answer sheet, write the letter corresponding to the answer you choose.

Please do NOT write on the test booklet.

SAMPLE A

Money falls off trees.

snow is to shovel as dollar is to

A. bill
B. rake
C. bank
D. green

SAMPLE B

Birds live in caves.

fish is to scale as bird is to

A. tree
B. egg
C. feather
D. nest
Part 8
DIRECTIONS

In each problem below, you will employ unusual mathematical operations in order to reach the solution. There are three unusual operations: graf, flix, and trup. First, read how the operations are defined. Then, decide what is the correct answer to the question.

On your answer sheet, write the letter corresponding to the answer you choose.

Please do NOT write on the test booklet.

There is a new mathematical operation called graf. It is defined as follows:

\[ x \text{ graf } y = \begin{cases} x + y, & \text{if } x < y \\ x - y, & \text{otherwise} \end{cases} \]

There is a new mathematical operation called flix. It is defined as follows:

\[ a \text{ flix } b = \begin{cases} a + b, & \text{if } a > b \\ a \cdot b, & \text{if } a < b \\ a + b, & \text{if } a = b \end{cases} \]

There is a new mathematical operation called trup. It is defined as follows:

\[ t \text{ trup } v = \begin{cases} t / v, & \text{if } t > v + 1 \\ t \cdot v, & \text{if } t < v - 1 \\ v / t, & \text{otherwise} \end{cases} \]

SAMPLE A
How much is 4 graf 7?

A. -3   B. 3   C. 11   D. -11

SAMPLE B
How much is 4 flix 7?

A. 28   B. 11   C. 3   D. -11
Part 9

DIRECTIONS

In each question, the shapes in the first row of boxes go together in a certain way to form a pattern. The second row of boxes follows the same pattern. Decide what shape goes in the empty box.

Please do NOT write on the test booklet.
Sample A:

A. 
B. 
C. 
D. 

Sample B:

A. 
B. 
C. 
D. 
References


