

PESSIMISTS' AND OPTIMISTS' REACTIONS TO INTERRUPTIONS ON A  
CREATIVITY TASK

by

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Abstract

Do pessimists and optimists react differently to interruptions on a creativity task? Sixty participants were asked to complete the Attributional Style Questionnaire, three divergent thinking tasks, and a questionnaire asking for participant demographics and attitudes about the interruptions they experienced during the tests. Three interruptions, which were initiated by a confederate or the experimenter, occurred between the tasks for the control group and during tasks for the experimental group. It was hypothesized that interruptions occurring during tasks would cause a decrement in performance and that pessimists would outperform optimists in the creativity task. An interaction between explanatory style and interruptions was also predicted; the interruptions were expected to have a greater negative impact on optimists. Although no significant differences were found for either optimism group or interruption condition, pessimists had slightly higher mean creativity scores than optimists. Also, when hopelessness scores were considered, individuals who were more hopeless had slightly higher creativity scores than individuals who were less hopeless. Practical applications to school and work environments are discussed.

Creativity is commonly defined as the production of original behavior that meets a standard of quality or utility (Guilford, 1968). Creative ideas are often generated when one rejects preconceived assumptions and attempts a new approach or method that might seem to others unthinkable and even impossible. One may underestimate the importance of creativity and suggest that creativity is only useful in the arts. However, creativity is essential in many other fields like education and business. In many ways people are asked to be creative in their daily lives whether this may mean cooking up something new for dinner or figuring out a new way to study for an exam.

One way creative thought occurs is through the use of convergent thinking processes. Convergent thinking is defined as the ability to use logical and evaluative thinking to narrow ideas to those best suited for given situations or criteria. This type of thinking is commonly used when people make crucial and well-formed decisions after reviewing multiple ideas or alternatives.

Another way creative thought occurs is through divergent thinking, which is the opposite of convergent thinking. Divergent thinking is the ability to form many possible original ideas to a given situation with fluency and speed. This kind of thinking is commonly used in school and business when a group of people is asked to brainstorm many solutions to a problem. Four components are typically associated with divergent thinking. Fluency is characterized as an ability to produce a large number of ideas to a problem in a short time. Flexibility is characterized as the capacity to consider a variety of approaches to a problem simultaneously. Originality is the ability to produce ideas

different from those of most other people. Elaboration is the ability to think through the details of an idea and carry it out.

Many tests of creativity exist and assess different components of creativity. The Creativity Tests For Children are designed for grades 4-6 and are composed of ten verbal and nonverbal (visual and figural) tests based around Guilford's Structure of Intellect Model of Intelligence (Cropley, 2000). This set of tests asks participants to use divergent thinking processes through several kinds of tasks. In these tasks, importance is given to quantity of answers and not to originality or effectiveness. The Torrance Tests of Creative Thinking (TTCT) are another group of creativity tests and are used among adults and children alike. The TTCT is widely used among psychologists today (Cropley, 2000). The TTCT assesses creativity both verbally and nonverbally and can be administered individually or as a group. These tests can be used for identifying exceptionally creative individuals and also in the discovery and encouragement of creativity in everyday life.

The Creativity Tests For Children and the TTCT are simply two of a plethora of creativity tests. Researchers have questioned the usefulness of these tests and the consistency of each. The test manual included in The Creativity Tests For Children reports internal reliabilities ranging from .42 to .97. This wide range of reliabilities may signal that the questions on this test do not yield stable and consistent results when repeated over time. However, Cropley (2000) also adds that most of the reliabilities in this range fall between .70 and .85, indicating that the questions on this test produce stable and consistent results most of the time. The TTCT test manual reports a median

inter-rater reliability from many studies of .97. The TTCT is one of the most popular instruments used in the social sciences, one reason clearly being its strong internal reliability.

Using tests of creativity in the business realm could yield important benefits. In prescreening applicants, it is possible that businesses could hire the most creative individuals among a large group. Businesses can then use the creative talents of their employees to further the success of a particular company.

Amabile (1998) explains business creativity as also requiring that ideas be appropriate, useful, and actionable. According to Amabile, business creativity is a function of three components: expertise, motivation, and creative thinking skills. Expertise is knowledge, which can be technical, procedural or intellectual. Two kinds of motivation exist. Extrinsic motivation occurs when managers offer monetary rewards and implement evaluations to motivate employees. Although, many managers and supervisors commonly employ these methods to spark employee motivation, Amabile suggests that these methods are among the least successful. A second kind of motivation is intrinsic motivation. Intrinsic motivation is one's inner passion to solve the problem at hand. It leads to solutions far more creative than do external rewards. When people become intrinsically motivated, they engage in their work for the challenge and enjoyment of it. The work itself then becomes motivating. The third and last component of business creativity is creative-thinking skills. Creative thinking skills determine how flexibly and imaginatively people approach problems. It also includes a person's capacity to put existing ideas together in new combinations.

Certain managerial practices can influence creativity in the workplace. These practices fall into six general categories: challenge, freedom, resources, work-group features, supervisory encouragement, and organizational support (Amabile, 1998). The extent to which an employee is challenged is crucial. Managers must carefully match a particular assignment to the employee so that the employee does not feel overwhelmed or threatened by a loss of control but also so that the employee does not feel bored. A creative working environment is also one in which people are given autonomy as to how they complete an assignment but not necessarily what assignment they are to complete. When goals are clearly specified and strategic, people are more likely to be creative. The two main resources that influence creativity are time and money. In some situations, a time pressure can create a sense of urgency and people may feel that they must rush, thereby increasing intrinsic motivation. However, creativity may diminish when deadlines are impossibly tight causing employee burnout. Managers must also determine the funding, people, and other resources a team will need in order to complete an assignment and they must know how much the organization can legitimately afford to allocate to that assignment. Teams that come up with creative ideas are those that are diverse and mutually supportive. When people with different expertise and creative thinking styles unite, there is more of a chance that these differences will spark new and useful ideas. Managers also destroy creativity by failing to acknowledge creative efforts made by employees. Expressing skepticism without exploring the creative potential of a particular piece of work will also inhibit business creativity. An organization's leaders

can support creative efforts by implementing procedures and by emphasizing values that show the importance of creativity to the organization (Amabile, 1998).

One situational variable that influences the creative working environment is the use of incentives. The literature regarding the benefits and disadvantages of rewarding creativity has been very mixed. Some cognitive theorists suggest that people are more creative when a reward is not present because they can play with ideas and materials and can take risks without concerns about goals extrinsic to the activity, specifically, attaining a reward (Amabile, Hennessey, & Grossman, 1986). Without a reward it may be possible to explore new cognitive pathways and engage in behaviors that are not influenced or distracted by an extrinsic constraint (Amabile, 1979). One of the earliest studies to find support for the negative effects of reward on creative performance was done by Kruglanski, Friedman, and Zeevi (1971). Half of the participants were told that they would be awarded a guided tour of Tel-Aviv University, while the rest of the participants were not told of any such reward. Creativity scores of the two verbal creativity tasks were higher when participants were not offered the incentive than participants who were told that they would receive the incentive. Ward, Kogan, and Pankove (1972) found that participants who were rewarded a penny immediately after each correct response during two verbal creativity tasks, came up with the most responses, as opposed to participants who were either rewarded at the end of each task or given no reward. Although participants receiving the immediate reward produced the most responses, these responses were scored as unoriginal compared to responses made by participants who received a delayed reward or no reward. Amabile, Hennessey, and Grossman (1986)

asked a sample of children to perform three tasks of creativity: one artistic, one verbal, and one problem solving. Half of the sample was offered a fourth task, picture taking, as an additional, fun activity while the other half of the sample was told that they would be allowed to take pictures with the camera if they promised to complete the three creativity tasks afterwards. Participants in the non-reward group produced more creative stories than children in the reward group.

Despite the research showing that incentives are detrimental to creative productivity, some behavioral theorists began to consider the possibility that incentives, when used to reward high divergent thought can lead to increases in creativity. High divergent thinking is a type of thinking that requires the individual to put forth a large amount of cognitive effort to complete a particular task. For example, asking a participant to produce ten responses for the use of a tin can requires high divergent thinking as opposed to asking a participant to instead produce five responses for the use of a tin can. Producing five responses as opposed to ten responses requires low divergent thinking in this particular example. According to Eisenberger and Cameron (1996), rewarding participants for divergent thinking training for high creativity in one task enhances subsequent creativity in an entirely different task. Reward, when used appropriately, has a much more favorable effect on task interest and creativity than was previously assumed. Eisenberger and Selbst (1994) asked a sample of students to either complete a high divergent thinking training or a low divergent thinking training using a word construction task. All participants were awarded ten cents for each response in this task. Afterwards, a circles task was administered in which participants were asked to

make pictures out of a set of circles drawn on a piece of paper. They found that the high divergent thinking group produced greater average creativity scores in the final circles task than participants previously trained in the low divergent thinking training.

Eisenberger and Selbst attribute these results to the Learned Industriousness Theory. The theory suggests that individuals learn what degree of creative thinking (either high or low divergent thinking) is required in order to attain a reward and convey that same degree of creative thinking on subsequent tasks. It is possible that participants trained with a high divergent thinking task *generalized* the high effort required to receive a reward to the circles task and furthermore, produced higher scores of creativity than participants trained in a low divergent thinking task. Eisenberger and Armeli (1997) found similar results.

Participants receiving five cents for responses in both the high and low divergent thinking training groups produced more original responses in the subsequent circles task than participants receiving one cent or no reward. The advantages of rewarding high divergent thought were also replicated in a study by Eisenberger, Armeli, and Pretz (1998). Participants were given high divergent thinking training, low divergent thinking training, or no such training using the Unusual Uses task. They were then asked to complete the circles task and either promised that they would receive seventy-five cents at the end of the task or not given any kind of promise. Participants in the high divergent thinking training who were told they would receive a reward in the final task produced the most creative circle drawings than any other group of participants. The promise of reward did not increase creativity in the final task from participants who either had low divergent thinking training or no such training.

Evaluation is another situational variable that may influence creativity in the workplace. Evaluations are ways of assessing employee performance and are commonly used in the working environment often to determine whether pay increases can occur. Evaluations can often prevent creativity from occurring at work especially when new ideas are met with criticisms. A culture of evaluation leads people to focus on external rewards and punishments and may even promote feelings of fear which will undoubtedly undermine intrinsic motivation (Amabile, 1998). Amabile (1979) examined the effects of external evaluation on artistic creativity using a group of female college students. Participants were either told that their artwork would be evaluated or told that their artwork would not be evaluated and were either asked to focus on a specific creative aspect, or were not given any particular focus. Art pieces produced by subjects who expected evaluation were judged as less creative than those who did not expect an evaluation. Creativity scores among participants in the non-evaluation group remained high no matter what participants were told what aspect of creativity to focus on.

Amabile (1982) investigated the impact of a competitive evaluation situation on the creativity of girls. A group of girls attended either a Saturday “Art Party” in which participants created an art collage without the pressure of an evaluation or a Sunday “Art Party” in which participants created art collages with the idea that only the best collages would win prizes. Collages made by girls in the non-competition condition were rated as significantly more creative than those made by girls in the competition condition.

Hennessey (1989) conducted a study in which a group of elementary school children were asked to create a geometric design on a computer. Participants were told

that their design would be evaluated by either the experimenter or the computer, or told that their design would not be evaluated. Judge ratings of the designs showed that participants who expected an evaluation scored lower in creativity than participants who did not expect an evaluation. Also, participants' perceptions of evaluations made by a computer were just as detrimental as participants' perceptions of evaluations made by the experimenter. A second study by Amabile, Goldfarb, and Brackfield (1990) had similar findings. Participants who expected an evaluation of their haiku poems were found to have significantly lower creativity scores compared to participants who did not expect an evaluation. Baer (1997) investigated the effects of evaluation and gender on creative performance using a sample of a hundred twenty-eight eighth grade students. Judge ratings of poems and stories were higher in creativity among participants who did not expect their work to be evaluated compared to participants that did expect their work to be evaluated. Expectation of evaluation has consistently shown to produce decreases in creative performance.

Despite the evidence showing that evaluations negatively influence creative productivity, one study by Shalley (1995) shows the opposite. Shalley proposed that in addition to the effects of evaluation, the effects of coaction and goal setting may also influence creativity. Coaction refers to the presence of coactors, or others working on the same task. Shalley found that participants with a creativity goal who worked alone with the expectation of evaluation had significantly higher scores of creativity on a complex-heuristic task than participants without a creativity goal who worked in the presence of others without the expectation of an evaluation. Although Shalley's research finds

support for the use of evaluations on creativity, most of the research demonstrates that evaluations negatively affect creativity.

Situational variables like the use of incentives and evaluations have generally been shown to be detrimental to creativity. In addition to situational variables, external contingencies have also been found to influence creativity. External contingencies are pressures occurring in the working environment that influence performance in a particular way. External contingencies include time pressures, or deadlines, performance pressures, and interruptions.

Time pressure affects creativity in different ways depending on whether the environment allows people to focus on their work, conveys a sense of meaningful urgency about the task at hand, or stimulates or undermines creative thinking in other ways (Amabile, Hadley, & Kramer, 2002). Employees seem to be more creative when they feel that they are on a mission and when they believe that they are doing important work. Creative thinking is unlikely when people feel distracted, receive little encouragement from senior management, and do not get the sense that their work is important. The research regarding time pressure and creativity has been minimal. However, one study by Kelly and McGrath (1985) tested the effects of time limits on participant performance of three business-type tasks called Production, Planning, and Discussion. Works that were generated in twenty minutes were longer, more original, higher in the quality of the presentation, and more creative than works that were generated in ten minutes.

Paez (2007) induced a time pressure to see whether individuals with different attributional styles would perform differently on a creativity task. Forty participants were assigned randomly to either a time pressure group or a no time pressure group and asked to create a collage using construction paper, paper shapes, and glue. No interaction was found between Attributional Style and time condition but a small effect for Attributional Style on creativity was found. Although the effect was not significant, average creativity scores were slightly higher among pessimists than optimists.

A third situational variable that may influence creative performance is interruption. Jett and George (2003) suggest that interruptions come in four forms: intrusions, breaks, distractions, and discrepancies. An intrusion is an unexpected encounter initiated by another person that interrupts the flow of an individual's work and brings that work to a temporary halt. Among the four kinds of interruptions, intrusions seem to be the most common in the workplace and possibly the most detrimental to the individual. Jett and George also suggest that intrusions can hinder an individual's ability to reach a state of total focus and involvement during a particular task. This state of deep absorption in an activity that is intrinsically enjoyable is called flow (Csikszentmihalyi, 1990). It is possible that when interruptions are induced, individuals may find it more difficult to achieve flow and furthermore, regarding creativity, find it more difficult to produce creative works.

The effects of attributional style on creative performance have not been investigated, but may be important in understanding which kinds of individuals are creative. The way individuals see the world plays an important role in how individuals

see themselves. Individuals tend to explain their own behavior and the behaviors of others by assigning attributes to these behaviors. An attribute is an inference about the cause of a behavior and is generally made based on situational, or external factors and dispositional, or internal factors.

It seems that personality can be best assessed using attributional style. Attributional Style is a way of explaining the good and bad events in a person's life and organizes individuals as having a pessimistic attributional style or an optimistic attributional style. An individual's attributional style is composed of scores from three dimensions, which include stable-unstable, global-local, and internal-external dimensions (Peterson, 1991). Individuals with an optimistic attributional style explain positive events as occurring because of them (internal). They also see positive events as evidence that more positive events will occur again (stable), and in other areas of their lives (global). Individuals with an optimistic attributional style also see negative events as being due to an outside force (external) and see them as rarely occurring (unstable). They also see negative events as have nothing to do with other areas of their lives (local). Individuals with a pessimistic attributional style explain events in the opposite way. They believe that negative events are caused by them (internal), will occur again in the future (stable), and that negative events in other areas of life are inevitable (global). They see positive events as rarely occurring (local) and as being caused by things outside of their control (external) that probably will not happen again (unstable).

The Attributional Style Questionnaire has been the primary instrument in assessing Attributional Style (Peterson, Semmel, VonBaeyer, Abramson, Metalsky, &

Seligman, 1982). It presents the reader with twelve hypothetical situations: six describing positive events and six describing negative events. Participants are then asked to provide what they believe is the major cause or explanation for each of the twelve situations and rate each major cause on each of the three Attributional Style dimensions. Ratings for each of the twelve responses are then summed across the three dimensions so that the total score reflects either an optimistic attributional style or a pessimistic attributional style.

Research regarding attributional style has consistently showed optimists to outperform pessimists in many areas including academics (Peterson & Barrett, 1987; DeMoss et al., 1993; Yates & Yates, 1995), business (Corr & Gray, 1996), athletics (Seligman, Nolen-Hoeksema, Thornton, & Thornton, 1990), and even health (Kubzansky, Sparrow, Vokonas, & Kawachi, 2001). In a longitudinal study by Nolen-Hoeksema, Seligman, and Girgus (1986), attributional style was used to predict helplessness deficits and academic performance in a group of school children. The sample of a hundred sixty-eight school children were administered the Children's Depression Inventory, a children's version of the ASQ, and the Life Events Questionnaire five times during the school year. Results from the study demonstrated that a maladaptive, or pessimistic, attributional style was associated with higher levels of depression at the first administration and throughout the course of the remaining administrations. A pessimistic attributional style also was significantly associated with lower levels of achievement and more helpless behaviors in the classroom.

Seligman and Schulman (1986) used the ASQ to predict productivity and quitting among life insurance sales agents. They found that people with more optimistic attributional styles sold 37% more insurance in their first two years of service than those with less optimistic attributional styles. Individuals with a more optimistic attributional style also remained in their job twice as much than individuals with a less optimistic attributional style. Gordon (2008) compared the performance of optimistic and pessimistic soccer players during a losing effort and during a subsequent winning effort. The study revealed that pessimists took significantly more shots during the win than they had during the previous loss and their pass completion ratio was significantly lower than those of optimists during that loss. Gordon suggests that during a loss pessimists may expect defeat and therefore take less action and initiative to win. Kubzansky et al. (2001) investigated the influence of attributional style on coronary heart disease incidence in a longitudinal study of 1306 community-dwelling men. The study showed that a more optimistic attributional style lowered the risk of coronary heart disease in older men. Kubzansky et al. suggest that a positive attributional style may promote a sense of control, positive social interactions, and other behaviors that may essentially promote better health.

Based on the research regarding attributional style, individuals with an optimistic attributional style seem to reap many benefits. These individuals view the world in a more positive light and do not let difficulties stand in the way of their happiness and success. Individuals with optimistic attributional styles seem to not only be happier and healthier, but are also potentially more successful in life.

An area of research that has not thoroughly been investigated is how attributional style influences creative performance. However, a study by DeMoss, Milich, & DeMers (1993) does find evidence for the idea that individuals with pessimistic attributional styles produce more creative works than do individuals with optimistic attributional styles. In DeMoss's study, one hundred twenty-eight students completed a verbal creativity test and a figural creativity test taken from the TTCT as well as the Children's Depression Inventory and the Children's ASQ. Results showed that higher scores on the figural scale of the creativity test were associated with a negative attributional style and higher levels of depression across both sexes.

In addition to the research done by DeMoss et al., a few senior theses have assessed the influence of attributional styles and certain external contingencies on creative performance. Anderson (2000) assessed the reactions of pessimists and optimists to a performance pressure on three tasks of creativity. Participants were asked to produce ten responses, fifteen responses, and twenty responses, for several creativity tasks taken from the TTCT. Anderson found that people with different attributional styles do react differently to performance pressures; less optimistic participants scored higher on fluency, originality, and flexibility than more optimistic participants as performance pressure increased. However, after an initial increase, more optimistic participants declined on the subsequent task. Past research would suggest that individuals with more optimistic Attributional Styles would perform better than individuals with less optimistic attributional styles. However, Anderson's research shows just the opposite.

The present research investigates whether individuals with pessimistic or optimistic attributional styles react differently to interruptions during a creativity task. Interruptions are uncontrollable occurrences that individuals experience everyday in school and business settings. Understanding the effects of interruptions is important because if interruptions are shown to have debilitating effects on work, individuals may prevent situations in which interruptions are likely to occur. These preventative measures may help individuals be more productive in these situations. The two independent variables in the present study were attributional style (pessimist, optimist), and interruption condition (interruptions between tasks, interruptions during tasks). Creativity was measured using a divergent thinking test. Based on the research of past senior theses, it was hypothesized that interruptions occurring during tasks would cause a decrement in performance and that pessimists would outperform optimists in the creativity task. An interaction between explanatory style and interruptions was also predicted. The interruptions were expected to have a greater negative impact on optimists. It is possible that pessimists have learned to ignore intrusions more than optimists. Also, optimists may have a stronger desire to do well on the creativity task and experiencing the interruptions could therefore cause them to lose their concentration more than pessimists.

## Method

### *Participants*

Forty Purchase College undergraduates (ten males, thirty females) participated in the study. Participant age ranged from 18 to 24 with a mean of 22.3 years and standard deviation of 1.71 years.

### *Materials*

The materials used were a statement of informed consent, the ASQ (Peterson, Semmel, VonBaeyer, Abramson, Metalsky, & Seligman, 1982), a set of three creativity subtests taken from the TTCT (Torrance, 1990), and a questionnaire designed specifically for this study. The set of three creativity subtests taken from the TTCT are called Asking, Guessing Causes, and Guessing Consequences. The picture typically used in order to complete these tasks was not used. Instead, in order to emphasize a business context, the experimenter used a picture found online of two men sitting at a table (Figure 1). The questionnaire assessed participant demographics and asked participants about how irritated they felt due to the interruptions they experienced (Appendix A). Additionally, a confederate was used in order to initiate some of the interruptions.

Each subtask of the creativity measure was scored for fluency and flexibility. Fluency refers to the appropriateness of each response. One fluency point was given to each appropriate response that related to the picture. Flexibility refers to how flexible the ideas are. Reviewing participant's responses on each creativity subtask led the experimenter to generate a list of categories in which responses seemed to fall (See Appendix B). One flexibility point was given for each response that fell into a category

for that subtask. For example, if on the Asking task a participant produced five responses relating to occupation and five responses relating to physical characteristics of the characters, then a flexibility score of 2 would be given, since the ten responses fell into only two categories. Practically all responses fell into the bulk of the categories listed for both the Guessing Causes task and the Guessing Consequences task which made it difficult to score responses for originality. As a result, participant's responses were only scored for fluency and flexibility.

### *Design and Procedure*

The present study used a 2x2 between subjects design. The first independent variable was attributional style and had two levels (pessimistic, optimistic). The second independent variable was interruption condition and also had two levels (interruptions occurring between tasks, interruptions occurring during tasks). The dependent variable was the total score taken from the three creativity tasks.

All participants were asked to complete the statement of informed consent, the ASQ, the creativity tasks and the questionnaire. The first creativity task, Asking, directed participants to generate as many ideas about the picture provided in order to better understand what was occurring in the picture. The second creativity task, Guessing Causes, directed participants to make as many guesses as to what could have possibly occurred that caused the event depicted. Guessing Consequences asked participants to make as many guesses to what the consequences were of the event shown in the picture. Participants had a maximum of thirty minutes to complete all three creativity tasks. All participants also experienced three interruptions. The first interruption was the

confederate knocking loudly on the door and presenting himself as a late participant. The second interruption was the experimenter's cellular phone ringing loudly. The third interruption was the confederate eating chips loudly and opening a can of soda. Half of the participants experienced the interruptions between tasks, specifically, during the directions of each task, while the other half of the participants experienced the interruptions during tasks, specifically five minutes after the start of each task. By using this design, all participants were exposed to the same amount of irritation, and in this way, irritation was controlled for. Once all participants had completed the questionnaire, they were debriefed and dismissed. In order to control for potential disturbances caused by cellular phones, all participants were asked prior to administering the ASQ, to turn off cellular phones and to try not to distract each other during the test taking experience.

### Results

Two two-way ANOVAs were used to analyze fluency and flexibility on the creativity task. Most participants seemed to have an optimistic attributional style and therefore, a median split was used to divide participants into two groups, Higher Optimism and Lower Optimism. Using fluency as the dependent variable, there was no significant effect for optimism group,  $F(1,36) = 0.71, p > .05$ , no significant effect for interruption condition,  $F(1,36) = 1.32, p > .05$ , and no interaction for optimism group and interruption condition,  $F(1,36) = 0.23, p > .05$ . Using flexibility as the dependent variable, there was again no significant effect for optimism group,  $F(1,36) = 2.07, p > .05$ , no significant effect for interruption condition,  $F(1,36) = 1.09, p > .05$ , and no interaction for optimism group and interaction condition,  $F(1,36) = 0.10, p > .05$ .

However, mean fluency scores were higher among lower optimism participants than higher optimism participants across interruption conditions (See Table 1).

Mean flexibility scores were also higher among lower optimism participants than higher optimism participants across interruption conditions (See Table 2).

The same two-way ANOVA was conducted on post-experimental ratings. The only significant effect was an interaction between interruption group and attributional style on participant perception of the effects of time pressure on performance. ( $F[1,36]=6.38, p=.012, \eta_p^2=.73$ ). Participants lower in optimism found the time pressure to be more disruptive than participants higher in optimism only when the interruptions occurred between tasks (control group). For participants in the experimental group, the opposite was true. When participants experienced the interruptions during tasks, participants higher in optimism found the time pressure to be more disruptive than participants lower in optimism (See Figure 2).

A subscale of the ASQ measures hopelessness, the extent to which participants see negative events as the result of pervasive and stable causes. When participants were grouped according to Hopelessness, participants who were higher in Hopelessness had both marginally higher fluency and flexibility scores than those with lower Hopelessness scores ( $F[1,36]=3.32, p = .08, \eta_p^2 = .08$ , and  $F[1,36] = 2.99, p = .09, \eta_p^2 = .08$ , respectively). Tables 3 and 4 display mean fluency and flexibility scores based on participant's scores of hopelessness.

## Discussion

The present study investigated just how individuals with pessimistic and optimistic attributional styles reacted to interruptions during a creativity task. Although no significant differences were found for optimism group or interruption condition, small mean differences were found in fluency and flexibility scores. Interestingly, participants lower in optimism scored slightly higher than participants higher in optimism. The results of this study contribute to the trend that individuals lower in optimism outperform individuals higher in optimism, which has been found in recent senior theses (Anderson, 2000; Paez, 2007).

These results may be due in part to the notion of defensive pessimism, which is evident in academics and has been suggested to occur in athletics (Gordon, 2008). Defensive pessimism is a strategy which involves setting unrealistically low expectations in a risky situation in an attempt to harness anxiety so that performance is unimpaired (Norem & Cantor, 1986). Less optimistic participants may have thought that they would perform poorly on the creativity task, but in preparing themselves for this outcome, they may have been more productive than those higher in optimism, resulting in slightly higher mean scores on the creativity task. It is also possible that individuals lower in optimism may act more critically than optimists in nature and as a result work harder to perform creatively. Similarly, individuals higher in optimism may find themselves overestimating their abilities and as a result, perform poorer than they had expected.

The hopelessness score was derived from the ASQ and refers to a tendency to see bad events as being pervasive and permanent in a person's life. The marginal effects for

hopelessness may suggest that the degree to which a person feels hopeless may have some influence on creative performance specifically on dimensions of fluency and flexibility on this kind of divergent thinking task.

The results of this study could be due to several factors. The creativity task used in the study was an adaptation of the Asking, Guessing Causes, and Guessing Consequences subtasks taken from the TTCT. Since norms had not been established for scoring this version of the task, it is possible that the categories used to assess flexibility were too restrictive. This may have led to a restricted range of flexibility scores. Also, scoring could have been more accurate by using more than one individual to score data. Although 53% of participants agreed that the ringing of the cellular phone was the most irritating during the creativity task, it seems that the influence of that interruption was not strong enough to influence creativity scores. The effects for interruption condition could have been more pronounced had a stronger interruption been used during the creativity task. It is possible that many students have experienced these three interruptions (cellular phone ring, late arrival, and noisy eater) on a regular basis either in class or at work. Since experiencing interruptions has become common among some individuals, it is possible that people have learned to ignore them.

Overall, these results add to the evidence that attributional style may be an important, but overlooked, variable in creativity. Future research should examine the role of explanatory style in other areas of creative activity. Further studies should also be conducted to find out how certain personality styles react to other situational variables on creativity tasks.

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Table 1. Mean fluency scores among participants with lower and higher optimism across interruption conditions.

<u>Condition</u>	<u>Optimism Group</u>	<u>Mean</u>	<u>Std. Dev.</u>
Control	Higher Optimism	36.22	11.3
	Lower Optimism	37.84	16.29
Experimental	Higher Optimism	29.00	13.65
	Lower Optimism	34.85	10.68

Table 2. Mean flexibility scores among participants with lower and higher optimism across interruption conditions.

<u>Condition</u>	<u>Optimism Group</u>	<u>Mean</u>	<u>Std. Dev.</u>
Control	Higher Optimism	14.11	3.02
	Lower Optimism	16.15	4.20
Experimental	Higher Optimism	13.27	3.80
	Lower Optimism	14.57	2.30

Table 3. Mean fluency scores among participants with higher and lower hopelessness across interruption conditions.

<u>Condition</u>	<u>Hopelessness Group</u>	<u>Mean</u>	<u>Std. Dev.</u>
Control	Higher Hopelessness	39.25	15.24
	Lower Hopelessness	34.70	13.13
Experimental	Higher Hopelessness	36.67	10.38
	Lower Hopelessness	25.89	12.79

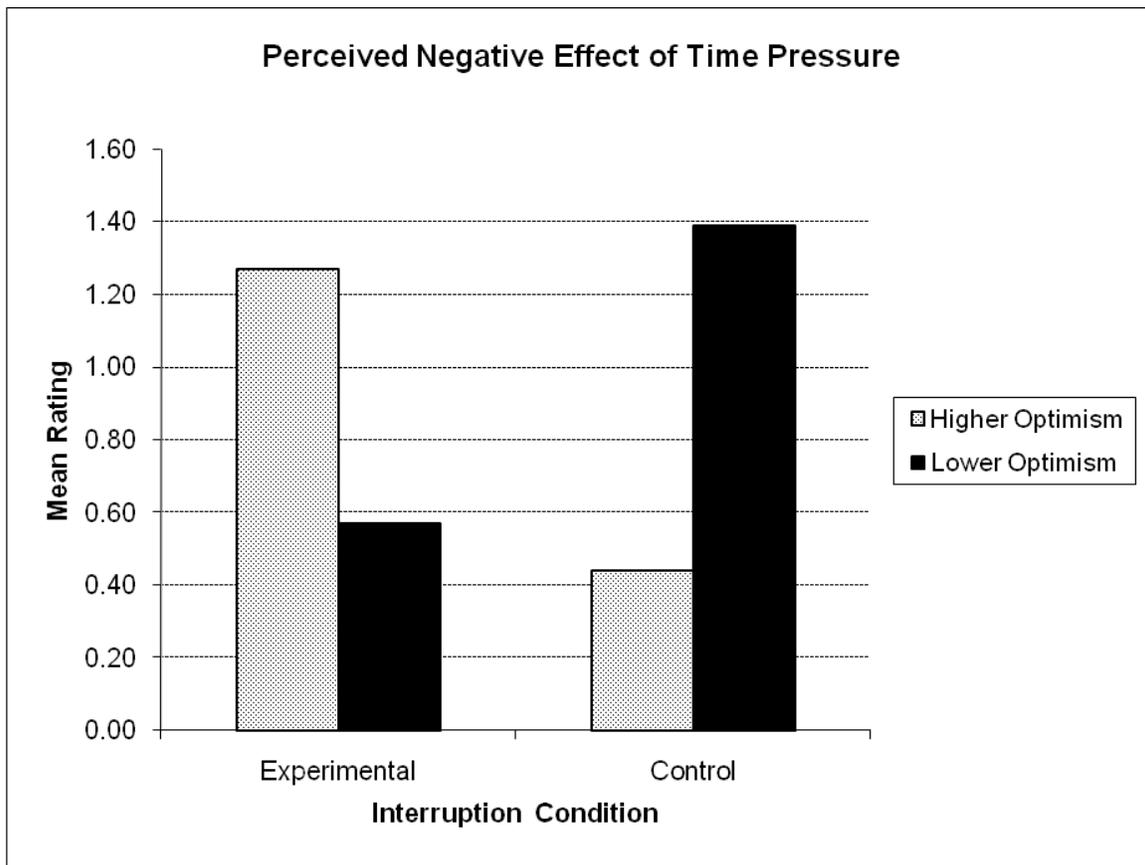
Table 4. Mean flexibility scores among participants with higher and lower hopelessness across interruption conditions.

<u>Condition</u>	<u>Hopelessness Group</u>	<u>Mean</u>	<u>Std. Dev.</u>
Control	Higher Hopelessness	16.08	4.39
	Lower Hopelessness	14.40	2.99
Experimental	Higher Hopelessness	14.89	2.15
	Lower Hopelessness	12.67	3.94

Figure 1.



Figure 2.



Appendix A

## Questionnaire

Part I – Tell me about yourself. Only make one circle per question.

1. I am (MALE, FEMALE).
2. I am a (FRESHMAN, SOPHOMORE, JUNIOR, SENIOR)
3. Please write your age on the line. \_\_\_\_\_
4. I am currently (EMPLOYED, UNEMPLOYED)

If you circled employed, answer 5a-d. Otherwise, skip to question 6.

5a. What is the job title of the job you work at most? If you only have one job please write that job title here. \_\_\_\_\_

5b. How long have you worked at your primary job? (LESS THAN SIX MONTHS, ABOUT A YEAR, ABOUT TWO YEARS, ABOUT 3 YEARS, OVER 3 YEARS)

5c. How often do you experience time pressures at your job? Please circle one.

0 Never	1	2	3	4 All The Time
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5d. How often do you experience interruptions at work? Please circle one.

0 Never	1	2	3	4 All The Time
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Part II – Creativity Task

6. How focused were you on the creativity task? Please circle one.

0 No Focus At All	1	2	3	4 Extremely Focused
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*Time Pressure*

7. How much did the time pressure affect you?

0 No Effect At All	1	2	3	4 Effected Me Totally
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8. How much did the time pressure contribute **positively** to your performance on the creativity task?

0 No Positive Effect	1	2	3	4 Completely Positive Effect
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9. How much did the time pressure contribute **negatively** to the creativity task?

0 No Negative Effect	1	2	3	4 Completely Negative Effect
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*Interruptions*

10. Did you experience any interruptions during the test taking experience? (Y/N)

11. If you experienced any of the following interruptions, please check them off:

- Banging on Door \_\_\_\_\_
- Cell Phone Ring \_\_\_\_\_
- Eating and Drinking \_\_\_\_\_

12. If you experienced other interruptions that were not listed on the checklist, please write them on the space below.

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13. Of the interruptions **on the checklist** please write the one (if any) that you feel affected your performance **most negatively** on the creativity task. Then, rate how much it affected you.

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0 No Negative Effect	1	2	3	4 Completely Negative Effect
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14. Please rate how pleasant the test taking experience was for you.

0 Not Pleasant	1	2	3	4 Extremely Pleasant
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15. Please rate how irritating the test taking experience was for you.

0 Not Irritating	1	2	3	4 Extremely Irritating
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Appendix B

**Categories For “Asking”**

Writing	Emotions	Relationship	Talking
Location	Time	Clothing	Objects In Picture
Personal Info.	Reason For Meeting	Physical Actions	Only People Present
Occupation	Conflict	Season	Ethnicity
Temperature	Weather Outside	Day of the Week	Health
How Did They Get There		Character Physical Characteristics	

**Categories For “Guessing Causes”**

Actions	Emotions	Relationship	Occupation
Details of Meeting	Outside Causes	(At An/Planning) An Event	

**Categories For “Guessing Consequences”**

Change In Relationship	Change In Emotion
Change In Health	Change In Money Situation
Change In Job	Change In Gender
Actions	Conflict/Confrontation
Outside Factor	