

The Role of Mood and Personality Type on Creativity

Paige D. Naylor, JongHan Kim, and Terry F. Pettijohn III*
Coastal Carolina University

ABSTRACT. Research generally supports the view that positive mood results in higher creativity. The purpose of these two studies was to examine the effect of mood and personality type on creativity in problem solving. Mood was manipulated (positive versus negative) differently and personality type was measured (extravert versus introvert) consistently in both studies using a sample of undergraduate college men ($n = 16$) and women ($n = 57$). An interaction effect between mood and personality type was hypothesized. Extraverts in a positive mood were predicted to have higher creativity scores, but introverts in a negative mood were predicted to have higher creativity scores. Results supported the hypothesis. Extraverts in a positive mood had higher scores of creativity and introverts' scores were higher when in a negative mood for both Study 1 ($p = .02$) and Study 2 ($p = .01$). These results are useful in understanding how mood and personality can influence creativity.

Creativity in problem solving is a major area of study (Vosburg, 1998a). Every day people are faced with problems they must solve, and sometimes people have to be creative when they need to solve a problem (George & Zhou, 2002). It would be beneficial to know what factors influence creativity in problem solving. Two studies were conducted to investigate the factors that influence creativity. In both studies, mood and personality were examined as two potential creativity influences. The goal of these studies was to learn more about the interaction between mood, personality type, and creativity in problem solving. In both studies, creativity was measured by four divergent problem solving tasks. Divergent problem solving is a measure of fluency and creativity where participants are asked to come up with as many solutions or answers to a problem as possible (Vosburg, 1998a). For example, one divergent problem solving task given to participants is, "a classmate is constantly talking during an important lecture, and therefore you are unable to concentrate. What are all the different solutions

you can think of to solve this problem?" Showing that there are multiple answers to a problem, not just simply one solution, demonstrates creativity (Vosburg, 1998a).

Creativity itself may be affected by mood. Vosburg (1998b) tested the effects of positive and negative mood on divergent thinking performance. First, mood was assessed, and then participants went on to complete four real-life divergent tasks. Two of the tasks involved problem solving, where participants were to produce as many solutions to a problem as possible. The other two tasks tested problem finding, where participants were asked to come up with as many problems involved in the question as possible. The tasks were graded simply on ideational fluency, which is the number of items produced for each task. Results showed a significant positive relationship between positive mood and task performance, meaning participants had a higher fluency of responses to the task when they were in a positive mood. There was also a significant negative relationship between negative mood and task performance, meaning that participants in a

WINTER 2013

PSI CHI
JOURNAL OF
PSYCHOLOGICAL
RESEARCH

negative mood had a lower fluency of responses to the task when they were in a negative mood. The researchers recommended replicating the study to involve actual mood induction to strengthen the validity (Vosburg, 1998b).

There is more to creative problem solving than just coming up with multiple solutions to a task. There is also the quality of the solutions. There are two main positions concerning mood and problem solving. The first is the general position: positive mood results in a positive relationship with creative problem solving across various tasks consistently. The second is the qualified position: the relationship of the general position is not always true; it varies according to the type of task. Sometimes positive mood simply produces a higher quantity of solutions, however not a higher number of quality ideas (Vosburg, 1998a). Vosburg (1998a) examined the difference between the two positions. Mood was assessed and then participants were asked to complete four divergent problem solving tasks. The first two problems were problem solving and problem finding (Okuda, Runco, & Berger, 1991). The last two were from Wallach and Kogan's (1965) battery of creativity tests where participants were asked to come up with as many uses for a shoe as possible, and to come up with as many representations for an ambiguous figure as possible. Vosburg (1998a) measured four factors. The first was ideational fluency, or the number of solutions. The second was ideational flexibility, or the number of different categories of solutions. These two are quantity measures. The next two are quality measures. One is originality and the next is usefulness, in other words functionality. Results showed a significant relationship between positive mood and the two quantity measures, fluency and flexibility, however not for the two quality measures, originality and usefulness. The results of this study support the qualified position that a positive mood does not always result in a positive relationship to creative problem solving (Vosburg, 1998a).

There are important characteristics to successful problem solving that include the quantity, the variety and utility, and the speed with which potential solutions are generated. Kaufman and Vosburg (2002) tested the effect of mood on early and late idea production. Early idea production, or coming up with the majority of solutions to a task early in the task, is least constrained by the solution. Late idea production, or coming up with the majority of solutions to a task later in the task, is most constrained by the solution. The hypothesis

was that people in positive moods would perform better with early idea production tasks and that people in negative moods would perform better with late idea production tasks.

Participants were divided into three groups: positive mood induction, negative mood induction, and a control group. Mood induction was achieved by showing participants clips of either positive or negative images. There were four tasks and participants had 4 min to work on each task. The first two tasks were real-life divergent thinking tasks, one of which was a problem solving task and the other a problem finding task. The second two tasks were again from Wallach and Kogan's (1965) battery of creativity tests. Results supported the hypothesis, showing that positive mood led to the best performance in the 1 min idea production. Participants in a positive mood were positively related to early idea production and negatively related to late idea production. This indicated that participants in a positive mood had better performance under the least constrained tasks, meaning participants in a positive mood performed better early on in the task when they knew that more time remained. Participants in a negative mood showed better performance on late idea production. This meant that participants in a negative mood performed best while under the most constrained tasks, later in the task when their time was almost up. The reasoning for the results is that people in a negative mood prefer to carefully consider all solutions to come up with the most qualitative solution because they are concerned with quality over quantity (Kaufmann & Vosburg, 2002).

Problem solving may occur in interaction with others and be influenced by these interactions (Brand & Opwis, 2007). For example, individuals who are extraverted prefer to work in groups, but individuals who are introverted prefer to work alone (Freyd, 1924). Brand and Opwis (2007) tested the effect of mood on problem solving to know if learning in dyads, meaning groups of two, affected performance. The researchers asked two questions. First, they wanted to know if positive mood impacted individual transfer performance after participants learned in dyads. Researchers wanted to see if a positive mood resulted in better transfer of learned materials than a negative mood. Second, researchers wanted to know how mood influenced transfer performance, and if mood made a difference in learning transfer tasks alone or in dyads. They conducted two experiments to test their hypotheses. They believed that positive

WINTER 2013

PSI CHI
JOURNAL OF
PSYCHOLOGICAL
RESEARCH

mood would lead to better transfer performance regardless of dyad status. They also believed that pairs of individuals who previously worked in dyads would perform better than those who only had individual experience with learning the transfer tasks. All participants were paired into dyads, learned the transfer tasks, and were split into two manipulation groups with positive or negative moods. Then participants completed a problem solving task that required them to use the transfer task knowledge they had previously learned. Results showed that people with positive moods needed significantly fewer attempts to solve the tasks assigned. The second experiment tested whether working in dyads was more beneficial than working alone. This second experiment also tested the effect positive and negative mood had on participants' transferring of learned tasks. The participants were divided into two groups. Half of them were put into dyad groups, the other half worked individually to learn the transfer task knowledge. Then dyad groups were either in the positive or negative mood conditions as were the individual groups. Next all individuals were placed into dyad groups, and the previous dyad groups performed their problem solving task that required the learned transfer knowledge. Results showed that people who had first worked in dyads and were in positive moods performed the best. Individuals who first worked alone and were in a positive mood did the second best. Third best were people who first worked in dyads and were in a negative mood. Lastly were the individuals who first worked alone and were in negative moods. Mood had an effect on performance, regardless of whether the learning was being done individually or in pairs. Positive mood resulted in better performance in individuals and in dyads. Also, when participants learned in dyads they performed better in dyads. The current study examined mood and creativity in problem solving and problem finding. This was beneficial to examine because it showed that performance was better when individuals were in a positive mood, regardless of whether they were learning alone or in pairs. This study followed the same pattern as previous literature that was reviewed (Brand & Opwis, 2007).

Another relevant study had similar results. This study was comprised of four different experiments all yielding consistent results. Isen, Daubman, and Nowicki (1987) tested to see if positive affect resulted in higher creativity in problem solving. Since positive affect correlates with positive mood

this study was relevant to examine for the current studies. Throughout four experiments they found that positive affect consistently resulted in higher creativity in problem solving regardless of the type of mood manipulation or measure of creativity.

Previous studies have revealed that positive mood correlates positively with creativity. However, one study found results that show negative mood correlates positively with creativity (George & Zhou, 2002). George and Zhou (2002) examined the effect mood had on creativity in a workplace environment. They hypothesized that employees would be more creative when they were in a negative mood and less creative when they were in a positive mood if certain circumstances or conditions were present. The first condition was that the employees' creativity was valued and rewarded in the workplace. This is achieved usually by promotions and pay raises for employees who contribute to the workplace by using their creativity. Examples include an employee coming up with new solutions to problems, finding a better, more efficient way of doing something, and so on. The second condition was that the employee be aware of how they feel, which is referred to as clarity of feelings.

In order for mood to be a factor in how creative an employee is, the employee must be aware of how they feel and the mood in which they are experiencing. Individuals' moods determine how creative they will be in the workplace. Also the opportunity for rewards and recognition will have an effect on individuals' creativity. If an individual is in a negative mood they may try harder to come up with new and useful ideas because they are more critical of themselves. Negativity may also allow these individuals to see that there are potential improvements to problems. However, individuals in a positive mood are not as critical of themselves. Also because they are in positive moods they tend to see things around them more positively. They are not as active in seeing potential improvements for problems in the workplace because to them everything is already working fine. This study was conducted in a workplace setting where creativity was valued and necessary. Employees and their employers provided information to test the hypothesis that employees in negative moods were more creative than employees in positive moods when they felt their creativity would be rewarded and valued, and they were aware of how they felt. Results supported the hypothesis. Based on the employees and the employers' feedback about their employees, results indicated that the employees in

negative moods were more creative than those in positive moods when they felt valued and rewarded and aware of their feelings (George & Zhou, 2002).

It is clear that mood has a major impact on problem solving as evidenced by the literature reviewed above. However, is there some other factor that may interact with mood to effect problem solving? Personality type, such as whether an individual is an introvert or an extravert, may also be a factor that influences problem solving. Literature states that extraverts tend to perform better on cognitive tasks (Landa, Martos, & López-Zafra, 2010). Extraverts also rely on positive stimuli around them to keep them happy. Extraverts particularly seek to be happy when completing effortful tasks. However, introverts do not seek to be happy when trying to complete effortful tasks (Tamir, 2009).

Tamir (2009) completed a study to examine if individuals continually seek out happiness. The hypothesis was that an extravert would seek out happiness before an effortful task, such as giving a speech or taking a test. Introverts were predicted to not seek out happiness before an effortful task, such as giving a speech or taking a test. Results supported the hypothesis. Extraverts seek out happiness before an effortful task, and introverts do not (Tamir, 2009). The reasoning is that extraverts need to be happy when performing tasks and introverts prefer not to be happy when performing tasks. Therefore, it makes sense to assume that introverts in a negative mood will outperform introverts in a positive mood on problem solving tasks.

The Current Studies

Research has shown that positive mood is related to greater fluency in divergent problem solving and negative mood usually inhibits the number of solutions to a problem (Vosburg, 1998b). However, are there times when positive moods can hinder creativity and negative moods can enhance creativity? Does personality, specifically whether a person is an introvert or an extravert, interact with mood states to influence creativity? Research has shown that extraverts tend to outperform their introverted counterparts on cognitive tasks (Landa et al., 2010). However, with introverts not seeking to be happy when performing effortful tasks, while extraverts do prefer to be happy (Tamir, 2009), it would seem introverts may perform better in circumstances when they are in a negative mood. This leads to an interaction prediction: introverts will be more creative when they are in a negative mood and extraverts will be more creative when they are

in a positive mood.

Relevant literature reviewed mostly examines how mood affects problem solving. The current studies examined the relationship between mood and problem solving, and also the relationship between personality type and problem solving. Not much research has been conducted investigating the positive effects of having introverts in a negative mood to enhance creative problem solving (Landa et al., 2010). The current studies were designed to show how mood and personality interact to influence creativity in problem solving.

Study 1: A Pilot Test

Using previously established methods of inducing mood and measuring personality and creativity, a pilot test using a small sample of college students was designed to test the current interaction hypothesis. Extraverts induced into a positive mood were hypothesized to be more creative in problem solving than extraverts induced into a negative mood. However, it was also hypothesized that when introverts were induced into a negative mood, they would be more creative in problem solving than the introverts who were induced into a positive mood. It would seem that not relying on positive reinforcements would let introverts be more creative while in a negative mood (Tamir, 2009).

Method

Participants. The sample size of participants was determined by the professor who taught the research course in which the current study was performed. Participants consisted of eight introverts and eight extraverts (10 men, 6 women). Participants were enrolled in psychology courses at a public university in the southeastern United States and were given course research credit for participating. The median age of participants was 23. Information regarding age and ethnicity were not gathered from participants. All participants were treated according to American Psychological Association ethical guidelines (APA, 2002). IRB approval was obtained before collecting data for this study, and all participants signed informed consent forms.

Materials. In order to determine extraversion and introversion, the Ten Item Personality Inventory was used (TIPI; Gosling, Rentfrow, & Swann, 2003). Gosling et al. (2003) discussed the convergence of the TIPI with other personality measures, test-retest reliability, and content validity in past investigations. Questions 1 and 6 were the only

WINTER 2013

PSI CHI
JOURNAL OF
PSYCHOLOGICAL
RESEARCH

questions considered for introversion and extraversion classification. Question 1 asked the participant to rate themselves on a Likert-type scale ranging from 1 (*disagree strongly*) to 7 (*agree strongly*) on how *extraverted, enthusiastic* participants described themselves. Question 6 had the participant rate how *reserved, quiet* they described themselves (Gosling et al., 2003). The rest of the personality questions were not necessary for determining introvert and extravert categories. The scores for the introvert and extravert questions were compared. If the participant scored higher on the introvert question, the participant was classified as an introvert. If the participant scored higher on the extravert question, the participant was classified as an extravert. If participants scored identically on the two questions, they were excluded from analyses. Two participants met this criterion. Generally, participants showed a strong difference between these personality areas. A demographic survey was also used to obtain information about participant age and sex.

In the current studies, positive mood was defined as “happiness;” an activating positive mood. Negative mood was defined as “sadness;” a deactivating type of negative mood. In order to manipulate mood, two slideshows were used. To induce a positive mood, a slideshow with 14 positive images, obtained from an Internet search, was shown. Examples of these images included peaceful landscapes, laughing children, and smiling faces. To induce a negative mood, a slide show of 14 negative images, obtained from an Internet search, was shown. Examples of these images included pictures of animal torture, starving children, and The Great Depression. Exposure to images was assumed to alter the mood of participants, but we did not include a manipulation check in this pilot test. Each image was shown for 5 s, making each slideshow last 70 s.

Four real-life divergent tasks were used from previous studies examining creativity (Kaufmann & Vosburg, 2002). The purpose of these tasks was to present each problem and have participants come up with as many responses as possible. The first problem was: “Your friend Rolf sits next to you in the classroom. Rolf likes to talk to you and often interrupts you when you are taking notes. Sometimes he distracts you so that you are missing important parts of lecture. What are you going to do? How are you going to solve this problem?” The second problem was: “Write down problems you consider important to your studies. You can mention problems related to the university-site,

professors, politics, other students, or whatever you can think of.” The third problem asked participants to “list as many possible uses for a shoe you can think of.” The fourth problem showed participants an ambiguous figure and asked them to “please list all the potential representations of this figure” (Kaufmann & Vosburg, 2002). A stopwatch was used to record the time for participants to complete the various problems.

Procedure. The experiment was conducted in a laboratory setting in individual sessions with the experimenter. Participants first completed an informed consent form. Next, participants completed the TIPI questionnaire (Gosling et al., 2003) and a demographic survey and turned it in to the experimenter. The next step was mood manipulation. Based on random assignment, the participant was either assigned to a negative or positive mood condition. For the negative mood condition, participants viewed the slideshow containing negative images. The positive mood participants viewed the slideshow that contained positive images. The last step in the experiment was to measure creativity in problem solving. The participant had 4 min per problem to come up with as many solutions to each of the problems as he or she could. When the participant finished the last problem, the experiment was complete. The participant was then debriefed and the real purpose of the study was revealed. During debriefing, participants were invited to contact the researcher to know the outcome of the study and were asked not to discuss the study with anyone else.

Results

The number of unique solutions to the four creativity tasks were combined to produce a single creativity score. In order to test the hypothesis that there was an interaction effect, a 2 (mood) x 2 (personality type) between subjects analysis of variance (ANOVA) test was conducted for overall creativity scores. A critical p value of .05 was used to determine statistical significance. The interaction effect between mood and personality type was statistically significant, $F(1, 14) = 6.95, p = .02, \eta_p^2 = .37$. The main effect for mood was not significant, $F(1, 14) = 2.11, p = .17, \eta_p^2 = .15$. The main effect for personality type was also not significant, $F(1, 14) = .53, p = .48, \eta_p^2 = .04$. See Figure 1 for results.

Discussion

The main goal of the current study was to find an interaction effect between the two independent

variables, mood and personality type. As stated above, results supported the hypothesis. When extraverts were in a positive mood they were more creative in problem solving. Extraverts in a negative mood were less creative in problem solving.

One of the major limitations of Study 1 was the small sample size. In addition, no mood manipulation check was employed. Therefore, Study 1 was conceptually replicated in Study 2 to strengthen the reliability of this current research. A different mood manipulation was used for Study 2, in order to determine if a different manipulation would yield similar results.

Study 2

The same interaction effect was predicted for Study 2 as in Study 1. Extraverts in a positive mood were expected to be more creative in problem solving than those in a negative mood. Introverts were expected to be more creative in a negative mood compared to those in a positive mood. In Study 1, there was no mood manipulation check. In Study 2, there was a mood manipulation check and its effectiveness was assessed. In Study 1, a slideshow of positive and negative images was used to manipulate mood. In Study 2, a writing prompt was used to achieve positive and negative mood manipulation. This different mood manipulation was used to examine if similar results would be achieved regardless of the type of mood manipulation. To address the low sample size concern from Study 1, a larger and more diverse sample was sought in Study 2 to provide sufficient power to detect significant differences.

Method

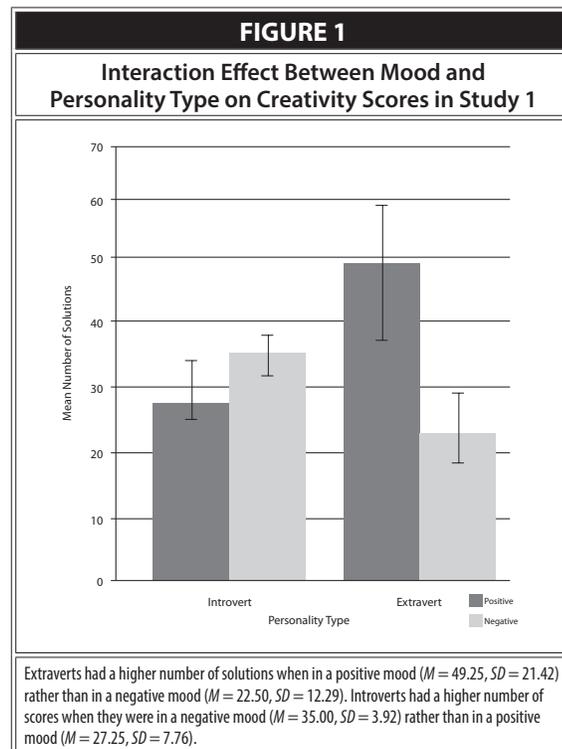
Participants. Participants were 57 undergraduate students (43 women, 14 men) from a public university in the southeastern United States. Participants were given course research credits for participating in the research, no additional compensation was provided. Of the 57 participants, 34 were categorized as extraverts and 23 were categorized as introverts. The mean age of participants was 22.50 ($SD = 6.16$). Forty-two participants were European American and 15 were African American. All participants were treated according to APA (2002) ethical guidelines.

Materials. The TIPI (Gosling et al., 2003) was again used to determine introversion and extraversion. The demographic survey had basic questions regarding participant race, age, and sex. Two writing prompts were used to manipulate

mood. These prompts were to write about the best (positive mood) or worst (negative mood) day of the participant's life for 4 min. The paper and directions were provided for the writing exercise. A mood manipulation check of two questions was also used. The participants responded to the questions on a Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The first question was, "I feel sad," and the second was "I feel happy."

The number of unique solutions to the same four problems were used in Study 2 as were used in Study 1 to measure the dependent variable, creativity in problem solving. A stopwatch was used to record the time for participants to complete the various problems.

Procedure. The same basic procedure was used in Study 2 as in Study 1. An experimental lab setting was used to conduct individual sessions. All participants provided informed consent prior to participation. Participants completed the TIPI questionnaire (Gosling et al., 2003) and the demographic survey before the mood manipulation. Based on random assignment, each participant was either assigned to a negative or positive mood induced condition. For the negative mood condition, participants ($n = 27$) were asked to write about one of the worst days of their life. For the positive mood condition, participants ($n = 30$) were asked to write about one of the best days of their life.



WINTER 2013

PSI CHI
JOURNAL OF
PSYCHOLOGICAL
RESEARCH

Participants had 4 min to write about the prompt. A mood manipulation check was used to ensure the mood manipulation worked.

The last step in the experiment was to measure creativity in problem solving. The participant had 4 min per problem to come up with as many solutions as possible to each of the problems. Participants were timed with a stopwatch to see how long they took to respond to each problem. When the participant finished the last problem, the experiment was complete. The participant was then debriefed and asked not to discuss the study with anyone else.

Results

To determine if the mood manipulation was successful, a 2-tailed independent *t* test was conducted. The test showed that participants in the negative condition did indeed feel sadder than participants in the positive mood condition, $t(55) = 2.00$, $p = .05$, $d = .54$, $M_s = 2.30$ and 1.73 , $SD_s = 1.14$ and $.98$, respectively. Participants in the positive mood condition felt happier than participants in the negative mood condition, $t(55) = 2.59$, $p = .01$, $d = .68$, $M_s = 3.77$ and 3.19 , $SD_s = .82$ and $.88$, respectively.

Again, the number of unique solutions to the four creativity tasks were combined to yield a single creativity score. In order to test the hypothesis that there was an interaction effect, a 2 (mood) \times 2 (personality type) between subjects ANOVA was conducted for overall creativity scores. The interaction effect between mood and personality type was statistically significant, $F(1, 55) = 6.81$, $p = .01$, $\eta_p^2 = .11$. The main effect for mood was not significant, $F(1, 55) = .70$, $p = .41$, $\eta_p^2 = .01$. The main effect for personality type approached significance, $F(1, 55) = 3.37$, $p = .07$, $\eta_p^2 = .06$; extraverts reported more solutions than introverts. See Figure 2 for full results.

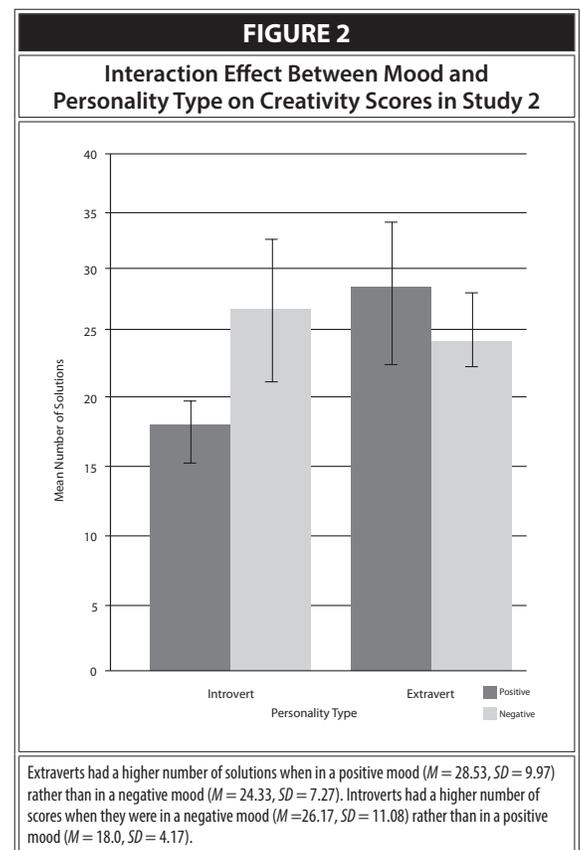
Discussion

The main hypothesis of Study 2 was the same as Study 1: an interaction effect between the two independent variables of mood and personality type. The results again support the hypothesis. Extraverts were more creative in a positive mood rather than in a negative mood and introverts were more creative in a negative mood rather than in a positive mood. Although there was not a main effect for mood, there was a marginally significant main effect for personality type. Overall, extraverts had higher creativity scores than introverts.

General Discussion

The main purpose of these two studies was to

examine if there was an interaction effect between the two independent variables of mood and personality type. This was supported by the results; when introverts were in a negative mood they scored higher on creativity in problem solving than when they were in a positive mood across two studies. When extraverts were in a positive mood they scored higher on creativity in problem solving than when they were in a negative mood across two studies. The fact that the same interaction effect was observed in both studies, even with different mood manipulations, is an important way to show these results are replicable. In Study 1, mood manipulation was accomplished by showing a slideshow, and in Study 2, it was accomplished by using writing prompts. In Study 1, the slideshow was shown and participants just watched and went on to complete the problems. However, in Study 2, participants were engaged in the mood manipulation by being asked to write for 4 min about a certain day in their lives. Then participants completed a mood manipulation check survey before continuing on to the problems. Regardless of how mood manipulation was accomplished, the results were consistent. However, we do note that the effect size when using the visual cues was greater than when



using the writing prompt. The writing prompt, although effective, may have produced greater variability in the strength of the mood manipulation because it was nonstandardized like the photo in the pilot test (i.e., everyone in the different mood conditions saw the same photos). Writing about one participant's worst or best day may not have elicited the same absolute emotion as writing about another participant's worst day. Despite this difference in effect size, the results of these two studies were statistically significant and show how mood and personality type interact to influence creativity.

Comparing the results of the current studies to previous studies (i.e., Vosburg, 1998a, 1998b), we do realize we did not find support for a main effect for mood in either of our experiments. Although we chose to focus on the interaction between mood and personality, perhaps previous samples have been comprised of a majority of extraverts who would exhibit greater creativity in a positive mood and lesser creativity in a negative mood. Depending on recruitment methods, and considering the possibility that college students and volunteers for studies may be more outgoing and sociable, this may be plausible. Further studies should be conducted to address this concern and identify when mood trumps personality in creativity outcomes. It should also be noted that the majority of the combined participants from Study 1 and Study 2 were women. Further studies could ensure a more equal sex participant ratio to see if results remain consistent.

The current studies could be strengthened by using a more thorough personality type inventory to determine extraversion and introversion, as opposed to measuring each with a single item. Time and budget concerns led to the adoption of the brief personality measure used in the current studies. Also, future studies could examine different types of positive and negative moods. In the current studies, positive mood was defined as "happiness;" an activating positive mood. Negative mood was defined as "sadness;" a deactivating type of negative mood. In future studies, it would be interesting to look at the different types of positive and negative moods. For positive mood, a deactivating type of positive mood would be "calm or relaxed." An activating type of negative mood would be "anger or fear" (Baas, De Dreu, & Nijstad, 2008). Expanding the subtypes of positive and negative moods would be interesting to examine. In addition to examining different types of moods, it would also be beneficial to measure the dependent

variable creativity in problem solving differently. An alternative measure of creativity insight is the Remote Associates Test (RAT; Mednick, 1962). The RAT presents three words that do not appear to have any relationship and asks what these items have in common. For example: golf, green, and beans, would be provided and the common element would be green (Baas, De Dreu, & Nijstad, 2011).

The new findings of this research are important because they add to the current literature. The new findings may help individuals understand how they may better influence their creativity in problem solving based on the condition of mood they experience. The new findings would benefit students participating in classes that have project assignments that allow for expression of creativity versus strictly traditional tests. Most professors incorporate "creativity" in their grading. Students with an extraverted personality may want to complete project assignments while in a positive mood, but students with an introverted personality may choose to complete their work in a negative mood to result in the most creative outcomes. The new research findings will help people in their efforts to better understand themselves and what makes them creative.

The current studies were successful in determining that personality and mood can influence creativity in problem solving. More specifically, mood and personality type influence creativity through an interaction. Personality type and mood must be taken into account together in order to influence creativity in problem solving. Extraverts will be more creative when in a positive mood than in a negative mood. Introverts will be more creative when in a negative mood than in a positive mood. The current study findings demonstrate the importance of both personality and mood *together* in determining creativity in problem solving.

References

- American Psychological Association (2002). Ethical principles of psychologists and code of conduct. *American Psychologist*, *57*, 1060–1073. doi: 10.1037/0003-066X.57.12.1060
- Baas, M., De Dreu, C. K. W., & Nijstad, B. A. (2008). A meta-analysis of 25 years of mood-creativity research: Hedonic tone, activation, or regulatory focus? *Psychological Bulletin*, *134*, 779–806. doi:10.1037/a0012815
- Baas, M., De Dreu, C. K. W., & Nijstad, B. A. (2011). When prevention promotes creativity: The role of mood, regulatory focus, and regulatory closure. *Journal of Personality and Social Psychology*, *100*, 794–809. doi:10.1037/a0022981
- Brand, S., & Opwis, K. (2007). Effects of mood and problem solving in dyads on transfer. *Swiss Journal of Psychology*, *66*, 51–65. doi:10.1024/1421-0185.66.1.51
- Freyd, M. (1924). Introverts and extroverts. *Psychological Review*, *31*,

WINTER 2013

PSI CHI
JOURNAL OF
PSYCHOLOGICAL
RESEARCH

- 74–87. doi:10.1037/h0075875
- George, J. M., & Zhou, J. (2002). Understanding when bad moods foster creativity and good ones don't: The role of context and clarity of feelings. *Journal of Applied Psychology, 87*, 687–697. doi:10.1037/0021-9010.87.4.687
- Gosling, S. D., Rentfrow, P. J., & Swann, W. B., Jr. (2003). A very brief measure of the Big Five personality domains. *Journal of Research in Personality, 37*, 504–528. doi: 10.1016/S0092-6566(03)00046-1
- Isen, A. M., Daubman, K. A., & Nowicki, G. P. (1987). Positive affect facilitates creative problem solving. *Journal of Personality and Social Psychology, 52*, 1122–1131. doi:10.1037/0022-3514.52.6.1122
- Kaufmann, G., & Vosburg, S. K. (2002). The effects of mood on early and late idea production. *Creativity Research Journal, 14*, 317–330. doi:10.1207/S15326934CRJ1434_3
- Landa, J. M. A., Martos, M. P., & López-Zafra, E. (2010). Emotional intelligence and personality traits as predictors of psychological well-being in Spanish undergraduates. *Social Behavior and Personality, 38*, 783–794. doi:10.2224/sbp.2010.38.6.783
- Mednick, S. A. (1962). The associative basis of the creative process. *Psychological Review, 69*, 220–232. doi:10.1037/h0048850
- Okuda, S. M., Runco, M. A., & Berger, D. E. (1991). Creativity and the finding and solving of real-world problems. *Journal of Psychoeducational Assessment, 9*, 45–53. doi:10.1177/073428299100900104
- Tamir, M. (2009). Differential preferences for happiness: Extraversion and trait-consistent emotion regulation. *Journal of Personality, 77*, 447–470. doi:10.1111/j.1467-6494.2008.00554.x
- Vosburg, S. K. (1998a). Mood and the quantity and quality of ideas. *Creativity Research Journal, 11*, 315–331. doi:10.1207/s15326934crj1104_5
- Vosburg, S. K. (1998b). The effects of positive and negative mood on divergent-thinking performance. *Creativity Research Journal, 11*, 165–172. doi:10.1207/s15326934crj1102_6
- Wallach, M. A., & Kogan, N. (1965). *Modes of thinking in young children*. New York, NY: Holt, Rinehart & Winston.

Author Note. Paige D. Naylor, JongHan Kim, Terry F. Pettijohn II, Department of Psychology, Coastal Carolina University, Conway, South Carolina, 29528-6054, USA.

Portions of this research were presented at the 30th International Congress of Psychology, Cape Town, South Africa.

Send correspondence concerning this article or reprint requests to Paige Naylor via email: pdnaylor@g.coastal.edu.