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## Does Verb Use Affects Mood and Happiness?

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VERB USE AFFECTS MOOD AND HAPPINESS

THE FLORIDA STATE UNIVERSITY

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DOES VERB USE AFFECTS MOOD AND HAPPINESS?

By

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## VERB USE AFFECTS MOOD AND HAPPINESS

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**ABSTRACT**

Two important trends are occurring in respect to scientific research in the field of psychology: 1) An increased focus on replication to facilitate psychological science as a self-correcting process, and 2) The exploration of quick and cost-effective methods to collect data using online systems such as Mechanical Turk. My thesis explores both of these issues in light of a recently reported study demonstrating that verb aspect use when describing past experiences (positive or negative) can modulate feelings of happiness and positive mood. Given the potential benefits of these findings to the understanding of well-being and methods to improve health, this thesis attempts to replicate these results online. The results generated by this thesis indicates a failure to replicate the results found in the previous study (though the general pattern of means produced the expected pattern). Verb aspect use did not significantly interact with task difficulty to influence current feelings of positive affect. However, Mechanical Turk was sensitive enough to pick up other expected relationships. Participants who completed a more difficult anagram task reported a significantly more negative affect afterward. Other expected relationships were observed with respect to satisfaction with life, happiness, and positive and negative affect. However, it is premature to suggest that the verb aspect adopted when describing previous experiences does not have an effect on mood/happiness. Methodological differences may explain the reported failure to replicate (e.g., online vs. in person). Implications and future direction are discussed in the conclusion section.

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### INTRODUCTION

In theory, science is fundamentally self-correcting in nature. Old theories are revised or discarded in the face of compelling contrary data, and positive findings based on chance (Type I error) or fraud are eventually discounted in light of mounting inconsistent evidence. However this might not be the case in practice. Replication is vital to scientific validity and there is a growing demand in the scientific community to standardize this process. Without replication erroneous findings can linger in the literature and continue to exert influence on future studies and theories. An analysis by Merkel and colleagues has discussed the necessity for a greater focus on replication, as only 1.07% of all psychology publications are replication studies (Makel, Plucker, and Hegardy, 2012). This result suggests that there exist few opportunities for misunderstandings based on flawed studies to be corrected. In addition to few replications, there are even fewer *independent* replications of findings. More than half (52%) of replications were conducted by the same research team as had produced the original research report.

A focus on replication is often discouraged due to the lack of incentive to conduct these types of studies as there exists great pressure in psychology to produce new findings. Replications studies are often seen as lacking prestige, originality, and excitement (Lindsay & Ehrenberg, 1993; Neuliep & Crandall, 1993; Makel, Plucker, and Hegardy, 2012). In addition to its potential to harm scientific understanding, a lack of focus on replication has other consequences as well. Psychological findings carry many important implications for society, and if these results are incorrect they can consume important resources. For instance our legal systems place a great emphasis on an accurate model of human judgment and choice, such as: jury decision making, severity of court penalties, and policy making (Rachlinski, 1999). This may damage the perception of the field of psychology and science as a whole if scientific results

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are no longer perceived as credible (Simmons, Nelson, & Simonsohn, 2011).

Given these implications, a primary focus of research should not only be centered on producing novel findings, but also on correcting the possibility of false positives (incorrect rejection of a null hypothesis). An alternative that is currently being evaluated is the use of undergraduate research as an opportunity to encourage and understand reproducibility (Grahe, Reifman, & Hermann, 2012). This approach benefits students in a few ways; it allows undergraduates the opportunity to participate in research while benefiting the psychology department's learning objectives and science as a whole. Although a study by Pearlman and McCann (2005) reported that only 10% of student projects were presented beyond the classroom, an important opportunity now exists for undergraduate research replications to be published in a new article type in the journal "Perspectives on Psychological Science" (Association of Psychological Science). This Registered Replication Report, which will consist of multiple labs, will produce high-quality replications of important psychology experiments along with comments by the authors of the original studies. This journal will help to incentivize replication studies.

The second part of my research hopes to discuss the effects of alternative methods and the possible benefits and limitation to these alternatives. A cost-effective and easy way to conduct some replications is through the system Mechanical Turk. Mechanical Turk (or Mturk) is an internet service provided by Amazon. Mturk is the most well-known Human Intelligence Task (HIT) crowd sourcing website available because of the facility to find a diverse pool of participants consisting of over 100,000 users from over 100 countries (Buhrmester, Kwang, & Gosling, 2011). There are some basic advantages that should be recognized by the scientific community. This tool, although it has its limitations, can help the researcher gather participants

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for a basic task at an efficient speed. For example, an experiment by Buhrmester posted a task that paid workers 1 cent for answering two pieces of information: age and gender. In 33 hours, they collected 500 responses or about 15 participants per hour (Buhrmester, Kwang, & Gosling 2011). In the past, academic psychology has relied on university students to act as a sample for whole populations. Research has shown that Mturk is able to provide a better standard gender ratio than university students who volunteer for research because its sample bias is more representative than a university population (Buhrmester, Kwang, & Gosling 2011).

There are also limitations to Mturk that need to be evaluated. Online surveys usually struggle with control on sample biases and the variability of participants' environment (Kraut et al., 2004; Azzam & Jacobson, 2013). Random selection may be a problem when part of the population cannot be included, and Mturk can only be used for evaluations that require responses from individuals who are 18 years or older (Azzam & Jacobson, 2013). It also excludes populations with limited or no computer skills which ultimately marginalize lower socioeconomic classes and the elderly. The uncontrollable variability of environments in which participants can use Mturk can and does impact the validity of the experiment (Azzam & Jacobson, 2013). Additional issues that may arise from lack of environmental control is that Mturk participants are less likely to pay attention to experimental materials and participants may also look for referential information about the experiment, thus affecting the objectivity of the survey (Goodman, Cryder, & Cheema 2012). Important differences that may also affect replication are mentioned by Dr. Joshua Smyth (1998), who found that studies that only use college students offer larger effect sizes as compared to studies that recruited a more general population. Lastly, research has demonstrated the effect of handwritten disclosure, as opposed to typed responses effects on cognitive resources, which cause participants to be more sidetracked



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from the main task of disclosure. These distractions may serve to lessen the task involvement and emotional arousal, therefore reducing the effectiveness of the task (Brewin & Lennard, 1999).

We have decided to both replicate and use an alternative crowd sourcing option in our experiment. Using Mechanical Turk for replication will allow us to review the effectiveness and limitations of alternative methods in psychological research, specifically in emotional regulation studies.

My thesis sought to replicate a recent study by Hart, “Unlocking Past Emotion: Verb Use Affects Mood and Happiness”, published in the scientific journal “Psychological Science”. Results of the study showed that participants who described a positive experience using the imperfective aspect, which reflects ongoing progression (e.g., I was walking), reported a more positive mood and larger level of happiness than did participants on the perfective aspect (e.g., I walked), which reflects completion (Hart, 2013). Similarly, participants that described a negative experience using the imperfective aspect reported more negative mood and less happiness than did participants who described a negative experience using the perfective aspect. Hart’s study was based on the idea that a person’s mood and judgment of their current happiness are strongly shaped by their memory of personal experience. Although in the past there has been proof of the health benefits of free-writing exercises using different pronouns (Seih, Chung, Pennebaker, 2011), Hart’s experiments demonstrated that the specific aspect of language used could influence the emotional state of a person.

To preview the design of the study, participants were randomly assigned to a positive or negative experience in which they solved easy anagram (positive), or difficult/unsolvable anagrams (negative). Participants were asked to then write about their experience with this task using the perfective (implying completing of past event) or the imperfective (implying ongoing

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processing) aspect using six sentences. Then affect, mood, happiness, and satisfaction with life was checked. A replication would involve those in the imperfective condition reporting a more negative mood after the negative experience, and a more positive mood after the positive experience since the language implies that this task was still ongoing.

## METHODS

### 2.1 Measures

#### *Positive and Negative Affect Schedule (PANAS)*

The Positive and Negative Affect Schedule (PANAS) (Watson, Clark, and Tellegen, 1988) is a frequently used measure to assess mood. The PANAS scale has a 10 items each that measure the two primary dimensions of mood, positive and negative affect;(e.g., negative affect: *distress, angry, fearful, guilty and jittery*; positive affect: *excited, proud, enthusiastic, inspired and strong*). Participants were asked to self-assess their mood according to 20 words that describe different feelings and emotions. A composite score was created by Hart (2012) that subtracted negative affect from positive affect to give a measure of net positive mood.

#### *Happiness and Satisfaction with Life*

Participants indicated their general level of happiness and satisfaction with life using two slider scale measures that ranged from 0 to 10. Participants dragged the slider bar to the value on the scale that matched their feelings.

### 2.2 Participants

Data was collected online from 183 participants using Mechanical Turk, and participants were paid .75 cents. Participation required an IP address originating from the United States. Twenty six participants were excluded from analysis for not providing six sentences in the

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correct verb form about their experience when prompted to do so. Another ten participants were excluded because they reported using external help in solving the anagrams. Seven participants were excluded because they reported having completed the study at least once before, and two participants failed the attention check which demonstrated that they were not paying the required attention to the task. This attention check asked participants to select the middle choice out of three choices in a multiple choice question. All participants passed the attention check requiring them to report the current president of the United States. The remaining total of a hundred and thirty eight participants were used for analysis (males, 67 females, 71). The entire sample reported English as their primary language. Participants self-reported their level of education as well: forty-two participants (30%) reported they completed secondary education, twenty participants (15%) said they completed an associate of arts, fifty-seven participants (41%) said they completed a bachelor's degree and nineteen participants (14%) reported they completed a graduate degree.

### 2.3 Procedure

Participants were assigned to write in either the perfective or imperfective aspect. They were randomly assigned to one of these conditions. After indicating consent, they were given a short tutorial on how to write in these verb aspects. They were then randomly assigned to either a positive-experience condition or a negative-experience condition and were given 6 minutes to complete 12 five-letter anagrams. Participants in the positive-experience condition worked on twelve easy anagrams, while participants in the negative-experience condition worked on six difficult and six unsolvable anagrams.

After the anagram task, participants were instructed to type six sentences about their experience into the computer. In the perfective-aspect condition, participants were asked to think

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and write about: “What happened?”, “What did you do?”, “What did you feel?”, and “What did you think about?” In the imperfective-aspect condition, participants were asked to think and write about: “What was happening?”, “What were you doing?”, “What were you feeling?”, and “What were you thinking about?” The top of this page provided examples of sentences in the imperfective and perfective aspect.

Participants then completed a test to indicate their mood by using the Positive and Negative Affect Schedule (PANAS) (Watson, Clark, and Tellegen, 1988). Finally, participants were asked to indicate their current happiness and satisfaction with life using a slider scale. At the end, demographics were collected, and participants were asked about what they thought the experiment was about. No participant reported suspicion that the verb tense was intended to increase or decrease mood/happiness.

## RESULTS

### 3.1 Effect of Experience Condition

As a first step, it was necessary to know if the anagram difficulty manipulation was effective in creating a negative experience for those who received the more difficult anagram questions. Participants who received the more difficult anagram questions showed a more negative mood than participants in the easy condition,  $t(136) = -2.93, p < .005$ . However, mood did not differ between the groups in terms of positive affect,  $t(136) = .25, p = .80$ . Nor did the two groups differ in terms of the composite score used by Hart (2012) that subtracted negative affect from positive affect to give an measure of net positive mood,  $t(136) = 1.46, p = .15$ . These results appear to confirm the effectiveness of the mood manipulation in that participants experienced more negative affect after trying to solve extremely difficult/unsolvable problems.

### 3.2 Experience Condition and Verb-Form Interaction

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The results of Hart (2012) indicated an interaction between verb form and task difficulty. Participants who described their experience using the imperfective form that implied ongoing processing tended to feel more negative affect after completing the more difficult anagram task. These scores are depicted in Figure 1. To test for an interaction between the verb aspect and task difficulty, we performed an ANOVA with aspect (perfective vs. imperfective) and task difficulty (easy vs. hard) on the same composite score used by Hart (2012). This analysis revealed no effect of verb form,  $F(1, 134) = .65, p = .42$ . This analysis also revealed no effect of anagram difficulty,  $F(1, 134) = 2.01, p = .16$ . Critically, unlike the results of Hart (2012), no significant interaction was observed between verb form and task difficulty,  $F(1, 134) = 1.01, p = .32$ .

To further explore the effect of verb form and anagram difficulty on mood, separate analyses were conducted on positive and negative affect alone (not using the composite score). Table 1 summarizes these scores. This analysis revealed no effect of verb form,  $F(1, 134) = .29, p = .60$ . This analysis also revealed no effect of anagram difficulty,  $F(1, 134) = .06, p = .81$ . Again, no significant interaction was observed between verb form and task difficulty,  $F(1, 134) = .24, p = .63$ . Finally, one more analysis was conducted focusing exclusively on negative affect. This analysis revealed no effect of verb form,  $F(1, 134) = .52, p = .47$ . However, this analysis did revealed a significant effect of anagram difficulty,  $F(1, 134) = 8.21, p = .005$ . Participants who received the more difficult anagram problems reported a more negative mood. However, no significant interaction was observed between verb form and task difficulty,  $F(1, 134) = 1.71, p = .19$ .

We also analyzed whether verb form and task difficulty influenced self-reported happiness and satisfaction of life. The analyses on happiness ratings revealed no effect of verb form,  $F(1, 134) = .001, p = .97$ , no effect of anagram difficulty,  $F(1, 134) = 1.00, p = .32$ , and no

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interaction between the two,  $F(1, 134) = .40, p = .53$ . For satisfaction with life ratings, this revealed no effect of verb form,  $F(1, 134) = .02, p = .88$ , no effect of anagram difficulty,  $F(1, 134) = .47, p = .50$ , and no interaction between the two,  $F(1, 134) = 1.91, p = .17$ .

### 3.3 Other Analyses

An exploratory analyses was conducted to check for other sensible relationships within the data. If present, these would validate Mturk as being sensitive enough to pick up some expected relationships. For example, we would expect self-rated happiness and life satisfaction to be correlated with measures of positive and negative affect. This was the case. Happiness was positively associated with positive affect,  $r(137) = .58, p < .001$ . Life satisfaction was also strongly positively associated with positive affect,  $r(137) = .44, p < .001$ . Levels of negative affect were negatively associated with self-rated happiness,  $r(137) = -.24, p < .01$ . Life satisfaction was also negatively correlated with negative affect,  $r(137) = -.20, p < .05$ . All of these correlations appear to confirm Mturk as a sensitive/reliable measure of affect.

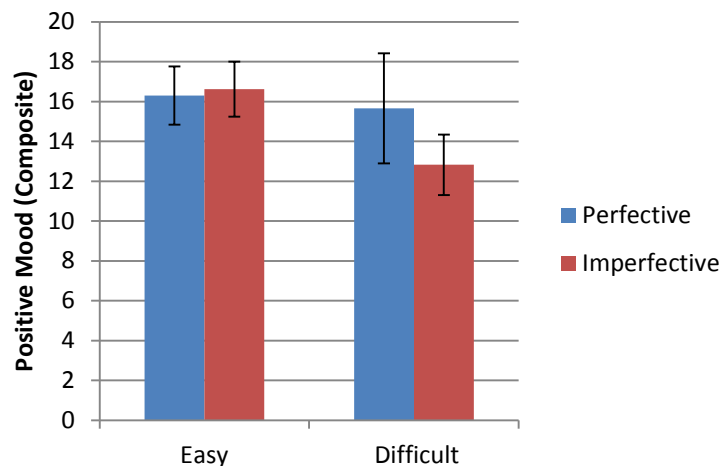


Figure 1. Positive Mood (composite score) as a function of verb aspect and anagram difficulty.

Table 1. Positive and Negative Affect, Happiness, and Life Satisfaction, as a function of verb

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aspect and anagram difficulty. SDs within parentheses.

	<u>Positive</u>	<u>Negative</u>	<u>Happiness</u>	<u>Life Satisfaction</u>
Perfective				
Easy	27.8 (1.2)	11.5 (.7)	6.5 (.3)	5.7 (.4)
Difficult	28.2 (5.0)	12.4 (2.2)	6.4 (1.1)	6.6 (1.2)
Imperfective				
Easy	27.7 (1.4)	11.1 (.41)	6.7 (.3)	6.3 (.4)
Difficult	26.7 (1.4)	13.8 (.84)	6.1 (.4)	6.03 (.5)

## DISCUSSION AND CONCLUSIONS

Hart (2012) found that negative experience created through a difficult/impossible anagram task induced negative affect. Participants who received the more difficult anagram questions showed a more negative mood than participants in the easy condition. Our replication successfully validated this effect and showed that the mood manipulation was effective.

This previous study concluded that participants assigned to the imperfective aspect condition, compared to participants assigned to the perfective aspect, showed an amplified mood (negative or positive) depending on their experience. Our experiment failed to replicate a significant interaction between experience condition and verb aspect on mood scores. Happiness and satisfaction with life ratings also revealed no interaction between experience condition and verb aspect.

It is important to acknowledge that just because we were unable to replicate the effect does not mean that the previous result was a false-positive (Type I error). I would like to address three variables that could have contributed to the inability to replicate Dr. Hart's findings, the first being the differences between studies conducted online vs. in-person administration. Lab settings offer the benefit of having a more controlled environment than online methods. Although

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studies conducted online offer a more representative sample, they remain more susceptible to random error than studies conducted in a lab setting. Further, sample differences occur when using different data collection methods, as found in a study conducted by Smyth (1998). Smith's paper indicated that studies using college students offered larger effect sizes as compared to studies that recruited a more general population. Lastly, research has demonstrated the effect of handwritten disclosure, as opposed to typed responses effects on cognitive resources, which cause participants to be more sidetracked from the main task of disclosure (Brewin & Lennard, 1999). Although Mechanical Turk is limited by some variables, it demonstrated that it was sensitive enough to pick up the expected emotional effects and relationships. Our findings suggest that Mturk may be a valid method for emotional regulation studies. Future research which utilizes Mturk as a method of data collection, specifically for emotional regulation method studies, should seek to establish a larger sample in order to leverage more statistical power. Given the potential influences of an uncontrolled testing environment, more participants may be needed than laboratory experiments in order to compensate for increased error variance.

## References



# VERB USE AFFECTS MOOD AND HAPPINESS

- Azzam, T., & Jacobson, M. R. (2013). Finding a Comparison Group Is Online Crowdsourcing a Viable Option? *American Journal of Evaluation*.
- Brewin, Chris R., and Hayley Lennard. "Effects of mode of writing on emotional narratives." *Journal of Traumatic Stress* 12.2 (1999): 355-361.
- Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk A New Source of Inexpensive, Yet High-Quality, Data? *Perspectives on Psychological Science*, 6(1), 3-5.
- Seih, Y. T., Chung, C. K., & Pennebaker, J. W. (2011). Experimental manipulations of perspective taking and perspective switching in expressive writing. *Cognition & Emotion*, 25(5), 926-938.
- Goodman, J. K., Cryder, C. E., & Cheema, A. (2012). Data collection in a flat world: The strengths and weaknesses of Mechanical Turk samples. *Journal of Behavioral Decision Making*.
- Grahe, J. E., Reifman, A., Hermann, A. D., Walker, M., Oleson, K. C., Nario-Redmond, M., & Wiebe, R. P. (2012). Harnessing the undiscovered resource of student research projects. *Perspectives on Psychological Science*, 7(6), 605-607.
- Hart, W. (2013). Unlocking Past Emotion Verb Use Affects Mood and Happiness. *Psychological science*, 24(1), 19-26.
- Lindsay, R. M., & Ehrenberg, A. S. (1993). The design of replicated studies. *The American Statistician*, 47(3), 217-228.
- Makel, M. C., Plucker, J. A., & Hegarty, B. (2012). Replications in Psychology Research How Often Do They Really Occur? *Perspectives on Psychological Science*, 7(6), 537-542.
- Neuliep, J. W., & Crandall, R. (1993). Reviewer bias against replication research. *Journal of Social Behavior & Personality*.
- Rachlinski, J. J. (1999). New Law and Psychology: A Reply to Critics, Skeptics, and Cautious Supporters. *Cornell L. Rev.*, 85, 739.
- Simmons, J. P., Nelson, L. D., & Simonsohn, U. (2011). False-positive psychology undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psychological science*, 22(11), 1359-1366.
- Smyth, J. M. (1998). Written emotional expression: effect sizes, outcome types, and moderating variables. *Journal of consulting and clinical psychology*, 66(1), 174.
- Perlman, B., & McCann, L. I. (2005). Undergraduate research experiences in psychology: A national study of courses and curricula. *Teaching of Psychology*, 32(1), 5-14.

## VERB USE AFFECTS MOOD AND HAPPINESS

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 106