

College of Saint Benedict and Saint John's University

DigitalCommons@CSB/SJU

---

Psychology Student Work

Psychology

---

4-24-2013

## The Effect of Positive and Negative Pictures on the Processing of Emotion-Related Words

Tricia K. Engen

*College of Saint Benedict/Saint John's University, tkengen@csbsju.edu*

Follow this and additional works at: [https://digitalcommons.csbsju.edu/psychology\\_students](https://digitalcommons.csbsju.edu/psychology_students)



Part of the [Psychology Commons](#)

---

### Recommended Citation

Engen, T. K. (2013, April). The Effect of Positive and Negative Pictures on the Processing of Emotion-Related Words. Poster session presented at Scholarship & Creativity Day, Saint John's University, Collegeville, MN.

This Presentation is brought to you for free and open access by DigitalCommons@CSB/SJU. It has been accepted for inclusion in Psychology Student Work by an authorized administrator of DigitalCommons@CSB/SJU. For more information, please contact [digitalcommons@csbsju.edu](mailto:digitalcommons@csbsju.edu).

## The Effect of Positive and Negative Pictures on the Processing of Emotion-Related Words

Tricia Engen

College of Saint Benedict and Saint John's University

### Author Note

Tricia Engen, Department of Psychology, College of Saint Benedict and Saint John's University.

I would like to thank Professor Robert Kachelski who helped make this research possible. He provided assistance with this study. Also, I would like to thank Elizabeth Bergner and Katelynn Strelow who collaborated with me in the experiment.

Correspondence concerning this article should be addressed to Tricia Engen, 37 S College Ave., P.O. box 495, St. Joseph, MN 56374. Email: [tkengen@csbsju.edu](mailto:tkengen@csbsju.edu)

**Abstract**

In our study, we wanted to test whether negative and positive stimuli affect lexical decision tasks. The participants consisted of 30 CSB/SJU students (14 males and 16 females). The participants saw either negative or positive pictures. After rating the various pictures, the participants' reaction times to words and non-words was recorded to see how priming affected their reactions. We hypothesized that emotional priming would make a difference in their reaction times to words of different emotions (positive and negative). The results demonstrated that there was not an interaction between the picture group the participants were assigned to and their reaction times to the negative and positive words.

### The Effect of Positive and Negative Pictures on the Processing of Emotion-Related Words

“In cognitive psychology, priming is the benefit to processing one stimulus as a result of already having encountered that stimulus or one similar” (Priming, 2006). Priming typically occurs when a person encounters a stimulus and then reacts to it later. There are different types of priming that tests priming in different ways. Short-term priming is when the participant has to respond to the word as quickly as they can. This is a type of measure that is used most often to test if the participant was faster to the specific stimuli (Priming, 2005). Semantic priming is used when a person encounters a stimuli and it is then measured in reaction time. Researchers typically use a lexical decision task in which participants respond if the word is a real word or a non-word. They also use the lexical decision task to test how quickly the participant reacted (Semantic Priming, 2006). Repetition priming is how the brain reacts to repeated stimuli for example seeing pictures of multiple dogs. Repetition priming has the largest priming effects than any other type of priming (Priming, 2005). There has been other research based on mood, behavior, judgment, and perception priming.

Steffen, Rockstroh and Jansma (2009) completed a study that included 21 participants based on decision making purchases. The purpose of the study was to see if positive and negative emotional ads had an effect on the participants decided to purchase. The researchers were curious if ads had an effect on purchase making decisions. The participants either saw a positive or a negative ad in the first part of the experiment. The study was contained with apartments (light or dark rooms), faces (positive or negative), and prices (cheap or expensive). The participants had to make decisions on which ones they would purchase. They found that the participants that had happy ads were more inclined to make purchases than those who had sad or mad ads. Emotions do play a big role in decision making (Steffen, Rockstroh, & Jansma, 2009).

Lamy, Fischer-Lokou, and Guéguen (2012) conducted another study in which participants were primed with love, distress, or solidarity. They were asked to rate on a 7-point scale how positive or negative the word that they received was. These participants were then asked by a person on the street to donate money to children in need. The results found that those primed with love were more likely to donate money for the children. Those that were primed with distress were less likely to donate money for the children (Lamy, Fischer-Lokou & Guéguen, 2012).

Priming can be extended to the processing of emotional stimuli. Previous research suggests that the human brain can be “primed” to certain emotions. “One of the most crucial questions in emotion research is what happens between the exposure to a stimulus and the emotional response” (Neumann & Lozo, 2012). There has been a lot of research based on emotional priming of the brain. Priming occurs when a person sees specific emotional stimuli and then processes it differently when they encounter the same emotional stimuli again. An example of emotional priming would be seeing a happy face and then later on reacting faster to the word “happy” and slower to the word “sad”. Most studies rely a lot on priming and the measurement of reaction time (Hinojosa et. Al., 2007). The brain will automatically react to the emotion and it occurs very quickly. Neutral stimuli are usually put into the experiments along with positive and negative stimuli because we seem to ignore the neutral and pay more attention to the affective stimuli (Altarriba & Basnight-Brown, 2011). Previous research also suggests that people will react faster to positive and negative stimuli than neutral (Carjaval, et. Al., 2004).

Gohier (2013) conducted a study in which he was comparing gender differences of the priming effect. The participants were shown pictures, words, or sounds and were asked if it was either pleasant or unpleasant. Their task was to categorize it as quickly as they could. The men

that were primed for negative seemed to show a larger priming effect than women. Both men and women showed a large priming effect for positive stimuli (Gohier et. Al., 2013).

Altarriba and Basnight-Brown (2011) conducted another study that used the affective Simon task to see if people reacted fast to negative or positive words, based on what they were primed for. The participants had two practice rounds. The first round they were supposed to hit the key on the keyboard if the word was either positive or negative. In the second practice round they had to hit the key on the keyboard if the word was either blue or green. During the actual test, the participants had various words that came up and if the word was in white, they had to focus on whether the word was positive or negative. If the word was in a blue or green color they had to hit the key for the color. Their results were that the group that saw positive stimuli reacted faster to positive words (Altarriba & Basnight-Brown, 2011).

Neumann and Lozo (2012) demonstrated a priming effect with a study focused on negative feeling such as fear and disgust. They first saw pictures of objects and had to categorize them as either fear or disgust by hitting the appropriate keys on the keyboard. In the second part of the study, they saw fearful, disgust, and neutral faces. Finally, the third task was masked words and reaction time to fear and disgust words. At the end of the study, they found that participants responded faster to the emotion they were primed for rather than other emotions (neutral) that they also saw. They also generalized that both verbal and nonverbal stimuli with fear and disgust can demonstrate the priming effect (Neumann & Lozo, 2012).

Ruys and Stapel (2008) completed a study based on emotional priming of the brain. These 120 participants were shown negative (fearful, disgusted and angry) or neutral pictures in the first part of the experiment. They were only asked to identify what side of the screen the pictures popped up (left or right). The next task was a sentence completion task where the

participants were asked to finish the sentences. The researchers categorized their responses as general negative words, general positive words, and neutral words. Finally, as the last part of the study, participants were asked in general how they are feeling. As they predicted, the participants shown the negative pictures were more likely to finish the sentences with negative words for example, if they were shown fear pictures, they finished the sentences with fear (Ruys & Stapel, 2008).

The purpose of our study was to see whether or not our brains are subject to emotional priming. Previous research suggests that participants will react faster to process emotion related words. So, we want to know if we wanted to conduct our own experiment to test whether or not people react faster to the emotional words that we were primed for. We are specifically interested in negative and positive priming and the reaction times.

We hypothesized that participants seeing negative or positive pictures would affect their reaction time to process the emotional words. Specifically, we predicted that the participants would react faster to the words that they were originally primed with (positive or negative).

## **Method**

### **Participants**

We conducted an experiment in which 30 College of Saint Benedict and Saint John's University (CSB/SJU) students participated. There were 14 men and 16 women involved in the experiment. The participants were between the ages of 18-22 years old. Our study consisted of 27 sophomores, 2 juniors, and 1 freshman. The students voluntarily participated in the study and they received no compensation for doing so.

### **Materials**

The materials that we used included both negative and positive pictures. These 20 pictures (10 positive and 10 negative) were found online using numerous search terms. The pictures were then put into two separate PowerPoint slideshows with timing intervals of approximately 30 seconds per picture. We had one negative slideshow and one positive slideshow. A list of questions for each picture was also included in the study. The questions took the form of both ratings and one to two word responses, with four questions per picture. We also used the Lexical Decision Task. We used a computer program (Inquisit 4) to present a lexical decision task in which we programmed 13 positive words, 13 negative words, and 26 non-words (Appendix A).

### **Procedure**

In the beginning of the experiment, participants were told that we were doing a study on cognitive processes. They were randomly selected into two different groups (positive or negative). Each participant was shown either ten positive or ten negative pictures. The slideshow was in 30 second intervals for each picture. They were then asked specific questions about each picture. The first two questions were on basic rating scales such as, how clear the picture is and if color was used effectively. Those questions were on a 4-point scale from 1 being not clear to 4 being very clear. The last two questions were questions specifically towards the picture such as what color eyes does the person have or what season is displayed in order for the participant to pay attention to the photograph. We had blank spaces where the person filled in a few words. The independent variables were the positive or negative pictures and the list of words. The dependent variable was reaction time.

After they rated the pictures, the participants then completed a lexical decision task. They had to hit the key on the keyboard as quickly as they could if it was either a real word or a non-



word. The real words were a mixture of both positive and negative words while the non-words were scrambled words. There was counterbalancing because the words were the same but they were randomized in the same way so that there were no order effects. We wanted to see if the participants would react faster to the emotion that they were originally primed for in the first part of the experiment. At the end of the study they were given a debriefing statement that told them what the study actually was about.

### **Results**

We had to do some data preparation before we analyzed the data. We calculated the averages of each participant for both of their negative and positive reaction times. We didn't calculate the averages for the list of non-words.

We performed a two way ANOVA on picture group and word type. There was no significant interaction between picture group and word type on participants' lexical decision times,  $F(1, 28) = 0.059, p = .810$  (Appendix B graph).

We performed a two way ANOVA on picture group. There was no significant main effect for picture group,  $F(1, 28) = .002, p = .961$ .

We performed a two way ANOVA on word type. The main effect for word type also was not significant,  $F(1, 28) = 0.878, p = .357$ .

### **Discussion**

In our hypothesis, we were testing to see whether or not negative or positive pictures effected lexical decision tasks. We predicted that the participants would react faster to words that they were previously primed for. Based off of previous research, participants typically will react faster to the emotion related words that they were primed for. Our predictions were not supported by our data because there was no significant interaction between the picture group and word

type. Participants did not react faster to positive or negative words after they were primed with positive or negative pictures.

There wasn't a significant difference for picture group and word type so the between-groups are similar to each other. Both of our variables were evened out across the two groups which help with our internal validity. Overall, participants reacted faster to negative words. I think this is because the brain is naturally drawn to notice negative stimuli than positive stimuli. Also, the brain automatically "ignores" the neutral stimuli as it is seen as unimportant.

We had limitations in our study that could have been the result of our insignificant data. We needed to use more participants with different class years and ethnicities. We had a small number of people participate in our study. Most of our participants were sophomores and white. This would make our study more diverse and generalizable to the population of college students at CSB/SJU.

Another limitation that we had was the timing in between the picture slideshow and the lexical decision task. Since we had to set up both on one computer, there was time in between where the participants could have lost focus which could diminish the priming effect. In the future, the programs should come one after another so that there is no time in between the two different tasks.

Previous research by Steffen, Rockstroh and Jansma (2009) included an experiment that was about positive and negative emotional ads and decisions to purchase. The participants either saw a positive or a negative ad in the first part of the experiment. They found that the participants that saw happy ads were more inclined to make purchases than those who had sad or mad ads (Steffen, Rockstroh, & Jansma, 2009). This related to our study because like reaction time, they were seeing if participants were more inclined to make purchases. Our results

did not support their research because our participants did not react to the emotion that they were originally primed for.

Lamy, Fischer-Lokou, and Guéguen (2012) conducted a study in which participants were primed with love, distress, or solidarity. They were asked to rate on a 7-point scale how positive or negative the word that they received was. These participants were then asked by a person on the street to donate money to children in need. The results found that those primed with love were more likely to donate money for the children. Those that were primed with distress were less likely to donate money for the children (Lamy, Fischer-Lokou & Guéguen, 2012). This did not support our hypothesis that we made in our study. We did not see any priming effect occur and it did in this study. It was different from our study since participants in this experiment donated after they were primed with love, and in our study the group that saw positive pictures did not react faster to positive words.

Previous research conducted by Neumann and Lozo (2012) suggested that we would react faster to the emotion that we were primed for. Participants were primed with negative emotions like fear and disgust. They reacted faster to those fear and disgust feelings rather than other emotions they were presented with (Neumann & Lozo, 2012). This did not relate to our findings on negative words. We hypothesized that when a person was primed with negative pictures they would react faster to negative words but it was not shown in our results.

Ruys and Stapel (2008) conducted a study also focused on negative priming. The participants were shown both negative and neutral pictures in the first part of the experiment. The next task was a sentence completion task where the participant was asked to finish the sentences. As they predicted, the participants shown the negative pictures were more likely to finish the sentences with negative words (Ruys & Stapel, 2008). This was not similar to our

study because we did not find that our participants reacting to negative pictures faster after they were primed.

Gohier (2013) conducted a study in which he was comparing gender differences of the priming effect. The participants were shown pictures, words, or sounds and were asked if it was either pleasant or unpleasant. Their task was to categorize it as quickly as they could. The men that were primed for negative seemed to show a larger priming effect than women. Both men and women showed a large priming effect for positive stimuli (Gohier et. Al., 2013). This was different then our study because we did not find significant results. Overall, they found large priming effects occur in their participants but this did not happen with our study.

Altarriba and Basnight-Brown (2011) conducted a study that used the affective simon task to see if people reacted fast to negative or positive words, based on what they were primed for. Their results were that the group that saw positive stimuli reacted faster to positive words (Altarriba & Basnight-Brown, 2011). This study did not support our research because they found significant date for both the positive stimuli and negative stimuli. In our study participants did not react faster to the negative or positive stimuli.

For further research, it would be interesting to test verbal stimuli along with nonverbal stimuli. A previous study tested this phenomenon. The participants had to complete a task where they saw repeated pictures and auditory words. They found that the participants responded more accurately if they heard the words being spoken rather than the pictures (Wagner et. Al., 1997). If we had spoken positive or negative words rather than pictures, our data may have been more significant and we could have seen a larger priming effect.

It would be interesting to only test one emotion at a time like Neumann and Lozo (2012) conducted. If we only tested one emotion like negative or positive along with neutral, we might

see a larger priming effect. Since participants naturally responded faster to negative, it would make sense to only use negative words along with neutral and non-words. It would be easier to see differences and our data would show more significance (Neumann & Lozo, 2012). Ruys and Stapel (2008) also tested only negative stimuli along with neutral. They also had significant results in which participants responded with negative feelings after they were primed with negative stimuli (Ruys & Stapel, 2008).

### References

- Altarriba, J., & Basnight-Brown, D. M. (2011). The representation of emotion vs. emotion-laden words in English and Spanish in the Affective Simon Task. *International Journal Of Bilingualism*, 15(3), 310-328.
- Carjaval, F., Vidriales, R., Rubio, S., & Martín, P. ( 2004). Effect of the changes in facial expression and/or identity of the model on a face discrimination task. *Psicothema*, 16, 587– 591.
- Gohier B., Senior C., Brittain P.J., Lounes N., El-Hage W., Law V., Phillips M.L., Surguladze S.A. Gender differences in the sensitivity to negative stimuli: Cross-modal affective priming [study](#) (2013) *European Psychiatry*, 28 (2) , pp. 74-80.
- Hinojosa J.A., Villarino A., Pozo M.A., Rosa Elosua M., Merino J.M., Moreno E., Luna D. An event-related potentials study of identity positive and negative priming (2007) *International Journal of Psychophysiology*, 66 (1) , pp. 48-55.
- Lamy, L., Fischer-Lokou, J., & Guéguen, N. (2012). Priming emotion concepts and helping behavior: How un-lived emotions can influence action. *Social Behavior And Personality*, 40(1), 55-62.
- Neumann, R., & Lozo, L. (2012). Priming the activation of fear and disgust: Evidence for semantic processing. *Emotion*, 12(2), 223-228.
- [Priming](#). (2005). In *Encyclopedia of Cognitive Science*.
- [priming](#). (2006). In *Encyclopaedic Dictionary of Psychology*.
- Ruys, K. I., & Stapel, D. A. (2008). Emotion elicitor or emotion messenger? Subliminal priming reveals two faces of facial expressions. *Psychological Science*, 19(6), 593-600.
- [semantic priming](#). (2006). In *Encyclopaedic Dictionary of Psychology*.
- Steffen, A., Rockstroh, B., & Jansma, B. (2009). Brain evoked potentials reflect how emotional faces influence our decision making. *Journal Of Neuroscience, Psychology, And Economics*, 2(1), 32-40.
- Wagner, A. D., Desmond, J. E., Demb, J. B., Glover, G. H., & Gabrieli, J. E. (1997). Semantic repetition priming for verbal and pictorial knowledge: A functional MRI study of left inferior prefrontal cortex. *Journal Of Cognitive Neuroscience*, 9(6), 714-726.

**Appendix A**

## Positive:

Wish  
 Lucky  
 Victory  
 Winner  
 Passion  
 Miracle  
 Reward  
 Cheer  
 Hopeful  
 Honest  
 Triumphant  
 Loyal  
 Proud

## Negative:

Guilty  
 Sinful  
 Fear  
 Betray  
 Anxious  
 Hostile  
 Stress  
 Hurt  
 Violent  
 Depression  
 Troubled  
 Fight  
 Angry

## Non-words:

Lgno  
 Hpapne  
 Wtare  
 Jmup  
 Muonaint  
 Iclmb  
 Mtcah  
 Fmlayi  
 Btohre  
 Bnuhse  
 Saipnhs  
 Dirkn  
 Apilrnae  
 Wthca  
 Caemr  
 Stiesr  
 Lfei  
 Smermn  
 Htahc  
 Gmea  
 Tastreo  
 Bcpakakc  
 Bezere  
 Ftuno  
 Sakrsh  
 baedr

**Appendix B**

