The Effects of Negative Emotional Valence on Word Recall

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Abstract

The current study developed as a means to demonstrate the effects of negative emotional valence on word recall. The researchers' prediction was that negative emotional words would be better remembered than neutral words. Previous research has produced conflicting findings thus it is important to further investigate the methods used to examine negative emotional words influence on memory (Doerksen & Shimamura, 2001; Hertel & Parks, 2002; Kensinger & Corkin, 2003; Madan et al., 2012; Talmi & Moscovitch, 2004). The results revealed no statistically significant difference between the negative word condition scores and the neutral word condition scores. The researchers discovered a confounding variable in the data. Future directions should focus on controlling instructions to avoid future results from being skewed.

Understanding what mechanisms improve or hinder memory is important for the continued research on memory processes. It is a common belief that heightened emotions result in an enhancing effect on memory, though, there is conflicting evidence surrounding the effect of negative emotional words on memory as studied in the field of science and psychology (Doerksen & Shimamura, 2001; Madan et al., 2012). Thus, the purpose of the present study was to investigate the effects of negative emotional valence on word recall. I defined negative emotional valence as the terms used to convey a negative emotional expression and word recall as remembering previously displayed information. The hope for this study was to confirm prior research findings that demonstrated the enhancing effects of negative emotional words on recall memory (Doerksen & Shimamura, 2001; Hertel & Parks, 2002; Kensinger & Corkin, 2003; Talmi & Moscovitch, 2004).

Hertel and Parks (2002) designed their experiment with the purpose of establishing evidence for enhanced word recall, specifically through episode-related emotions, or situational arousal. The researchers predicted that the emotional organization of words would improve word recall separate from word recall by the organization of word meanings. The participants, 22 females and 18 males, were Trinity University undergraduate students in an introductory psychology course who volunteered to participate. Five lists of 15 predetermined nouns, displayed in random order, represented the positive, neutral, and negative word conditions. The researchers included an interval task of finding hidden figures in a series of drawings for a period of five minutes. Hertel and Parks, (2002) then asked participants to verbally recall as many words from the viewed lists as possible. The findings demonstrated that participants recalled words from the emotional lists more often than the neutral lists. There was no significant difference in scores between the positive and negative word conditions, though positive words held a higher recall score than negative words. In conclusion, the researchers implied that negative words could hold a more vivid mental image that results in distraction during periods of learning. The researchers' data affirmed the use of emotional words to investigate word recall in the current study by finding significant results under this condition.

The purpose of Doerksen and Shimamura's (2001) study was to determine if emotional stimuli, such as positive and negative words, affect memory. They predicted that emotional words would increase the rate of free recall, or unprompted recollection, which would contribute to the improvement of another form of memory. The researchers recruited 24 undergraduate students, 16 women and 8 men, from the University of California (Doerksen & Shimamura, 2001). The

researchers developed two lists of words to establish a neutral condition and an emotional condition, each containing 32 words. The list of emotional words contained 16 unpleasant terms and 16 pleasant terms with the words presented one at a time. The researchers administered a five-minute filler task of simple math problems before presenting the recall test. The findings demonstrated a significant positive effect of emotional words on recall memory compared to neutral words. The significant results of emotional valence on word recall established in this study influenced the use of emotional words as an experimental condition in the present study.

Madan et al. (2012) constructed their study to resolve conflicting evidence surrounding memory enhancement using emotional arousal. They predicted that if emotional arousal enhanced memory formation, then emotionally arousing words would produce higher recall results than neutral words among undergraduate psychology students. The researchers created lists for the negative word condition and the neutral word condition, each containing 64 words. Participants viewed 16 words by random assignment before completing an interval task of four simple arithmetic problems for less than one minute. The results from the recall test showed no significant difference between the scores from the two conditions. The findings from Madan et al. (2012) demonstrated conflicting evidence for the use of negative valence on word recall. They highlighted a specific limitation that certain neutral words may present as a threat in social aspects and therefore affect attention and memory. This indicates that authority figures should carefully consider words used in group settings, such as a classroom, to avoid negative reactions.

Past research confirmed significant effects of combining positive and negative words into one emotional valence condition (Doerksen & Shimamura, 2001; Hertel & Parks, 2002). However, it is important for the current study to specifically distinguish the effects of negative emotional valence on word recall. The study conducted by Kensinger and Corkin (2003) examined whether participants were more likely to remember negative words than neutral words. The prediction was that recall memory of negative words would produce higher scores than recall memory of neutral words. The participants consisted of 18 male undergraduate and graduate students recruited from the Massachusetts Institute of Technology (MIT). The list of words designed for the recall memory test included 140 words total with 70 neutral words and 70 negative words selected from the Affective Norms for English Words (ANEW). The participants rated each word. This task acted as a distractor for an interval of five minutes. The test confirmed higher scores for the participants' recall under the negative words condition as opposed to the neutral words condition. Different studies produced conflicting evidence for the use of negative emotional words as an experimental condition (Kensinger & Corkin, 2003; Madan et al., 2012). Thus, in addition to influencing the use of negative emotional words as an independent variable and a task as a distractor in the current study, the results of this report validated the need to establish further evidence of negative valence effects on word recall.

Talmi and Moscovitch (2004) developed an experiment with the purpose of comparing the effects of negative emotional words, randomized neutral words, and categorized neutral words on memory. The researchers predicted that negative emotional words would be recalled more often than random neutral words or neutral words grouped into categories labeled "kitchen" and "music." Undergraduate students from the University of Toronto volunteered to participate and consisted of 19 males and 41 females. Talmi and Moscovitch (2004) constructed two lists of 28 words for each of the conditions. Participants were randomly assigned to view one of the six total lists and viewed each word randomly presented one at a time, while saying each word out loud. The interval period consisted of a distractor task and lasted between 40 and 45 minutes. The recollection test occurred in the form of written free recall. The findings demonstrated that participants recalled negative emotional words as well as categorized neutral words significantly more often than random neutral words. These results established further findings to support the significant effects of negative

emotional words as an independent variable and therefore confirmed the use of a negative emotional valence condition for the current study.

Prior studies demonstrated a significant effect of emotional words on memory under an assortment of conditions among different participants (Doerksen & Shimamura, 2001; Hertel & Parks, 2002; Kensinger & Corkin, 2003; Talmi & Moscovitch, 2004). The common subjects in these experiments were the use of negative emotional words compared to neutral words which influenced the adoption of those concepts into the current examination. The purpose of the present study was to investigate the effects of negative emotional words on recall memory after completing a task. The hypothesis was that negative emotional words affect memory more often than neutral words. I predicted that utilizing negative emotional words in the experimental condition would produce higher recall memory scores for participants more than the neutral words condition.

Methods

Participants

The sample consisted of 43 psychology undergraduate students recruited from a Psychology Research Methods course at the University of Colorado, Colorado Springs (PSY 2110). Two responses were incomplete, thus the data collected comprised of 41 participants. Compensation consisted of class points for PSY 2110. The sample had an age range of 19 to 50 (M = 22.95, SD = 4.96). The gender identification disclosed by the participants involved three separate categories including one Other, 31 Females, and nine Males. Class levels comprised of one Freshmen, two Sophomores, 20 Juniors, 13 Seniors, and five Senior+.

Materials

Electronic instruments with internet access facilitated the completion of the survey online. The researchers disclosed information about the present investigation in a standard Informed Consent report intended to gather consent to participate. A brief demographic questionnaire accumulated details regarding age, college class level, and gender identity. An instructions page contained directions for the following task. The experimental condition consisted of 10 randomized negative emotional words. The control condition included 10 randomized neutral words. An online search engine generated the initial lists of words and random selection produced 10 words for each condition. A four-point Likert scale that used the ranks "not often," "somewhat often," "often," and "very often," allowed rating the use of each word to act as a distractor during the emotional and neutral word conditions. A list of 14 difficult trivia, or detailed questions, such as "Where is the Sea of Tranquility located?", and "What year did the Titanic sink?" served as an interval delay. The purpose of the interval delay was to eliminate primacy and recency effects, or the product of being primed or recently viewed, while allowing time to encode the words. Another instruction page described how to complete the presented questions. A recall memory test presented 10 text entry boxes with directions on how to complete the test. A debriefing document revealed the present study's objective and disclosed the hypothesis. The researchers uploaded the survey's contents online using the Qualtrics system and set the assigned time limit requirement of 10 minutes.

Procedure

First, the participants gave consent to participate in the study electronically. Next, the participants read the directions on how to complete the following task. The Survey Flow mechanism in Qualtrics randomized the assignment for either the experiment group (n = 20) or the control group (n = 21). The participants viewed a set of 10 words, one at a time, while using the previously

presented Likert scale to rate how often they used each word in a week. After reading the instructions, participants completed as many of the 14 trivia questions as accurately as possible in a two-minute period. After the delay, participants entered as many words as they could remember from the different lists they viewed. The participants then completed a brief demographics survey. Lastly, the participants read the debriefing form that revealed the intentions of the current investigation along with the hypothesis.

Results

The researchers used an independent samples *t*-test to analyze the data. The test selected specifies if a statistically significant difference exists between the means of two independent groups. The participants' word recall scores under the negative emotional valence condition ($M = 3.50$, $SD = 2.65$) were not significantly higher than the neutral condition ($M = 3.81$, $SD = 2.\ 32$), $t(39) = +/- 0.40$, $p < .05$.

Discussion

The purpose of the current investigation was to determine the effects of negative emotional valence on word recall. The hypothesis was not confirmed in that negative emotional words were not recalled more than neutral words. Thus, the prediction was not supported in that the negative emotional condition did not yield higher test scores than the neutral condition. I could not confirm the validity of these findings due to a lack of significant results, which appeared to stem from limitations that skewed the data.

Previous experiments produced conflicting evidence involving the effects of negative words on memory (Doerksen & Shimamura, 2001; Hertel & Parks, 2002; Kensinger & Corkin, 2003; Madan et al., 2012; Talmi & Moscovitch, 2004). The purpose of Hertel and Parks', (2002) investigation was to establish evidence for the effects of emotional valence on word recall. The significant results of this experiment impacted the decision to use emotional words in the method of the present study. Hertel and Parks (2002) included 15 words in their condition lists compared to the 10-word lists that our study used. The data from this investigation did not support their findings. This indicates that the number of words in the test may influence the affect emotional valence has on word recall. This means the presence of emotional valence may require a substantial amount of emotional connection in order to affect memory.

Doerksen and Shimamura (2001) designed an experiment to examine the effects emotional stimuli had on memory. Their comparison of a neutral word condition with an emotional word condition guided the choice to use similar conditions in the present investigation. However, Doerksen and Shimamura's (2001) study found significant results using a five minute task interval, whereas the current experiment used a three minute task interval. The results of the current study did not produce similar findings. This means that longer intervals may allow more time for participants to encode the information presented. Therefore, when examining aspects of cognitive processing, longer intervals may allow a clearer representation of memory organization.

Kensinger and Corkin (2003) conducted an examination that focused on the effects of negative emotional valence on word recall. Their use of negative emotional words, as well as a distractor, inspired the current study to adopt these methods. Yet, their study consisted entirely of male participants while the present investigation included a combination of genders. The findings of our experiment did not corroborate the findings of this study. This suggests a difference in word recall performance between gender-dominant groups and mixed groups. This indicates the possible presence of these gender differences in the present study that went unnoticed due to a lack of accounting for these factors.

The purpose of Talmi and Moscovitch's (2004) investigation was to compare the effects of negative emotional words, randomized neutral words, and categorized neutral words on recall memory. The results of this experiment supported previous findings of Kessinger and Corkin (2003) and further influenced the present study to confirm the use of negative emotional words as a condition compared to neutral words. The experiment designed by Talmi and Moscovitch (2004) instructed participants to say each word presented out loud, whereas participants viewed and rated words in the current examination. The results of the present study did not validate the effects found in their investigation, which implies that speaking each viewed word could enhance the effect of emotional valence on word recall. This could stipulate that activation of the speech process and may magnify the effects of memory organization, thus further influencing recall.

I discovered a confounding variable in the results. It was clear from responses such as "1937" and "a group of cats," which coincided with the trivia questions, that some participants misunderstood the instructions for the word recall test. This confound skewed the data; thus, it is unclear if the findings were valid under these conditions. Designing clearer and more specific instructions for the recall test would control for participant misinterpretation for future studies. Another solution could involve the use of shape puzzles as a distractor task instead of trivia questions to avoid confusion over the list of words. Although these solutions would better control for the confound of misinterpreting instructions, it seemed as though specific limitations had a larger influence on the results.

One limitation to the current study was the 10-minute time limit set for the student participants to complete the study as part of their graded assignment. This notion implies that some participants rushed through the test questions, so the scores are not a proper representation of their word recall. A solution to this limitation would be to recruit participants who do not have the demand of an assignment deadline. Another limitation in the present study is the time of the semester, given that all participants were college students enrolled in the same PSY 2110 course. With the study conducted near the end of the semester, it is possible that fatigue in the participants' personal academic careers affected their performance in our survey. It seems as though the impact of this limitation may have influenced the misinterpretation of the recall test instructions. This is evident in certain participant answers such as "wtf," "excuse me," and "girl, I don't know." It appears as though the time of semester potentially affects participant willingness to retain attention, follow instructions, or be concerned with the quality of their performance. One solution could involve rearranging the course timeline to include more time off from other syllabus demands to reduce the chance of fatigue. Another solution would be better compensation for student participation.

Previous research produced conflicting results when investigating the effects of negative emotional words on recall memory (Doerksen & Shimamura, 2001; Madan et al., 2012). To confirm either of the findings, researchers could construct an experiment comparing the effects of negative emotional words and neutral words on recall memory using an in-person, within-in subjects design. Having a lab assistant verbally explain the instructions would eliminate the possibility of confusion while reading instructions as well as controlling for certain individual differences to better establish the internal validity. Findings produced by an experiment such as this may further support previous research that has found differences between negative and neutral words.

Another research design could align more similarly with methods used by previous examinations. For instance, using a negative emotional valence list containing 15 or more words as Hertel and Parks (2002) did may exaggerate the effects on word recall to a significant level. The study could also use a five-minute task instead of a three-minute task as Doerksen and Shimamura (2001) did in their study. These two alterations influenced by the methods of statistically significant experiments may produce higher scores than the current study.

If the present study produced statistically significant results, then the findings would hold educational and clinical implications. If negative words enhanced recall by emotional association, then avoiding specific words and phrasing that hold negative emotional valence would establish a more comfortable learning environment in school for students who previously suffered trauma. By reducing the use of certain words, we reduce the possibility of enhancing students' recall of negative emotional valence as a response to it. Secure surroundings are important for students' psychological and social development, so this implication would have had a significantly lasting effect. In a clinical setting, this research could apply to mindfulness therapy. If evidence showed that negative emotional words enhanced recall, then therapy could include constructing a list of words developed from previous research to consciously avoid using due to their emotional associations. This application could inspire a deeper awareness among patients and clients in regard to negative emotional valence and its effect.

The purpose of this study was to examine the impact negative emotional valence had on word recall. The current findings did not confirm our prediction that the negative emotional words would produce higher recall scores compared to the neutral words, although, a confounding variable skewed the results. For further research, it is important to know what enhances memory, even if it is negative, in order to gain a deeper understanding. This topic requires more research involving the use of negative words to support previous findings and to establish a direction for future investigations (Doerksen & Shimamura, 2001; Hertel & Parks, 2002; Kensinger & Corkin, 2003; Madan et al., 2012; Talmi & Moscovitch, 2004).

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Appendix

Negative Word List:

1. Pain
2. Lonely
3. Shame
4. Guilty
5. Regret
6. Panic
7. Depressed
8. Betrayal
9. Hopeless
10. Rage

Neutral Word List:

1. Coach
2. Guarantee
3. Stone
4. Reaction
5. Chin
6. Platform
7. Figure
8. Glance
9. Passenger
10. Area