ALGEBRA : JURNAL PENDIDIKAN, SOSIAL DAN SAINS

ISSN : 2807-663X e-ISSN : 2807-629X
Journal Homepage : https://ejournal.yana.or.id/index.php/algebra
Volume 5 Number 3 (2025)

THE EFFECT OF GIVING WORDS CONTAINING EMOTION ON WORKING MEMORY: VISUOSPATIAL SKETCHPAD

Jihan Faridatul Azkia[1], Larasati Maulana Yusuf[2], NazmaNayla Zulfa[3], Pradnya Pramitha Maharani[4], Fenisa Candra Ramadhina[5]
[12345] Program Studi Psikologi, Universitas Satu, Bandung, Indonesia
Correspondence Email: fenisa.candra@univ.satu.ac.id

ABSTRACT

Memory is important in a person's life to do every task given, as well as in daily life. Memory can be formed due to stimulus that is present in everyday life. Stimulus can be in the form of touch, movement, smell and sound. Not all stimuli are entered and processed by our brain and become a memory. One form of memory is visuospatial sketchpad which functions to process memory in visual and spatial form. Individuals will more easily remember a word if it contains certain emotions. In this study, the researcher's goal is to test whether there is an effect of giving words that contain emotions on visuospatial sketchpad. This research is experimental research, involving 14 students who are divided into three groups, namely groups with neutral, negative and neutral emotion words. The measuring instrument used in this study is CEFI. The analysis of this study used ANOVA test. The results showed that there were differences between groups with positive, negative and neutral emotion words ($p = 0.013$, $F(2,11) = 6.687$). This shows that. Based on the Post Hoc test, it was found that words containing negative emotions were easier to remember compared to words containing positive emotions.

Keywords: emotion words, memory, negative emotion words, neutral emotion words, visuospatial sketchpad

INTRODUCTION

Memory is an interesting topic for psychology researchers to study. This is because memory plays a crucial role in everyday life. Some functions of memory in everyday life include controlling and organizing information received (Eichenbaun, 2017). Another function of memory is to regulate flexibility for current and future decision-making(Kirsten C. S. Adam , Laura-Isabelle Klatt , Jacob A. Miller, Marlene Rösner, Keisuke Fukuda, 2025; Wang, 2025). The stimulus that generates a memory can take various forms, one of which is words. Words are one of the smallest units of language. Language plays a role in the process of memory formation, helping to shape, categorize, and construct emotional experiences (Kristen A, 2017).

The visuospatial sketchpad is a component of working memory that can recall visual information, which can transform mental images (Baddeley & Hitch, 1974). Visuospatial sketchpads are typically associated with words containing emotions. This is because words with a specific emotional content typically evoke a specific mental image in a person's memory. Visuospatial sketchpads make it easier for someone to remember an object or information with the help of a specific emotion. Someone will have difficulty remembering information if it doesn't involve a specific emotion.

A person can experience emotions when their circumstances undergo a significant or sudden change, which can have a positive or negative impact. There are two types of emotions: positive and negative. Positive emotions consist of various pleasant emotions, such as joy, pride, satisfaction, love, or other similar positive states (Nadhiroh, 2015). Negative emotions refer to undesirable feelings, while positive emotions refer to aspects of emotional temperament, such as traits that indicate an individual's tendency to experience positive emotions(Fortenberry et al., 2013). These negative emotions cause feelings of discomfort and discomfort, which can impact a person's attitudes and behaviour in relationships with others (Graham et al., 2008).

College students, as a group frequently exposed to emotional information in academic and social contexts, are a relevant population for research. However, there are still limitations in research specifically addressing how emotionally charged words affect students' visuospatial sketchpad. Therefore, further research is needed to understand how emotional words affect working memory processes in college students.

This study aimed to determine whether there are differences in students' visuospatial sketchpad abilities after being exposed to words containing positive, negative, and neutral emotions. This study also aimed to determine which types of emotional words most impact students' visuospatial sketchpad. This study only measured one component of working memory, the visuospatial sketchpad, and did not include other memory aspects such as verbal memory. The words used as stimuli were text only, not images or sounds, which can also convey emotion.

This study is beneficial for students, as they can associate the thing they need to remember with a specific emotion, such as positive, negative, or even neutral emotions. This research is also useful for increasing the effectiveness of information processing in an academic context, meaning that the visuospatial sketchpad can help students when studying.

RESEARCH METHOD

This study used an online experimental method. Experimental research is a study that manipulates certain variables to determine their effects (Kerlinger, 1966). Visuospatial sketchpad is the ability of University Satu Bandung students to store and edit visual information (such as shapes, colours, or images) and spatial information in a short time. The sampling technique used in this study was a between-participant post-test-only design (Johnson & Christensen, 2007).

This study used the CEFI (Concreteness, Emotion, and Subjective Frequency Norms for Indonesian Words) test developed by Sianipar et al., (2016). This test is classified based on valence values: negative words (2.08–4.65), neutral words (4.57–5.69), and positive words (5.70–7.92). Of the total 1,490 words, 15 words were selected through a filtering process based on letter length (5–9 letters), a certain valence range, and word type (noun, adjective, verb). Participants' answers will be assessed based on the answer key held by the researcher. The data to be assessed by the researcher are the results of the participant's post-test. The minimum score that each respondent will have been 0, the maximum score that can be obtained by the respondent is 15.

The word stimuli were presented in video format via Zoom screen share, with black text, a white background, Canva Sans font size 240, and a three-second duration per word. The following are the word categories presented to participants. The test statistics used in this study are the ANOVA test.

RESULT AND DISCUSSION

Based on table 2 the results of the ANOVA statistical test on the three groups, it was found that there were significant differences between the groups given words containing positive, negative, and neutral emotions (p value = 0.013, F (2,11) = 6.687). This indicates that the type of words given has an influence on the participants' visuospatial sketchpad working memory abilities. The ANOVA test was conducted after ensuring that the data in this study had a variance p value = 0.70 > 0.05. Based on table 1 frequency distribution of participant gender, most participants who took part in the experimental research were female with a percentage of 57.1%.

Table 1 Respondent Gender

Gender	Frequency	Percentage
Man	6	42.9%
Woman	8	57.1%
Total	**14**	**100%**

Table 2 ANOVA Test Results

Cases	Sum of Squares	df	Mean Square	F	p
Nama Kelompok	44.679	2	22.339	6.67	0.013
Residuals	36.750	11	3.341		

Table 3 Descriptive ANOVA Test

Nama kelompok	N	Mean	SD	SE	Coefficient of variation
Kelompok 1	4	6.250	1.708	0.854	0.273
Kelompok 2	5	8.800	1.643	0.735	0.187
Kelompok 3	5	4.600	1.643	0.927	0.451

To see the difference between words with positive and negative emotions that are most easily remembered by participants, a Post Hoc test was conducted. Based on table 4 the results of the Post Hoc Test, it was found that there was a significant difference between the negative and neutral groups, namely (p value = 0.01), which supports the assumption that words with negative emotional content are easier to remember. However, no significant difference was found between the group with positive words and the other groups, which may indicate that positive words are not strong enough to significantly improve visuospatial sketchpad performance. There are other factors such as valence and arousal levels that have not been well controlled in the stimulus.

Table 4 Post Hoc Test Result

		Mean Difference	SE	df	t	ptukey
Kelompok 1	Kelompok 2	-2.550	1.226	11	-2.080	0.140
	Kelompok 3	1.650	1.226	11	1.346	0.401
Kelompok 2	Kelompok 3	4.200	1.156	11	3.633	0.010

Based on Table 3, the descriptive results show that the group with words containing negative emotions had the highest average score (M = 8.8; SD = 1.64), followed by the positive group (M = 6.25; SD = 1.71), and finally the neutral group (M = 4.6; SD = 2.07). This finding is consistent with the theory of negativity bias, namely the human tendency to remember negative information more easily than positive or neutral information (Garrison & Schmeichel, 2019). Research conducted by Xie et al., (2021) & Xie & Zhang, (2016) presenting similar results, his research suggests that words with negative emotions will improve visual memory for sketchpads. This suggests that individuals exposed to information with negative emotional content will remember more of that information. Furthermore,

subsequent research suggests that negative emotions can improve a person's ability to remember, but do not increase the number of items that need to be remembered.

The human brain is more likely to perceive words with negative emotions. This is because negative words tend to trigger increased attention and detail processing. Neurocognitively, negative stimuli are often considered more evolutionarily important, so the brain automatically allocates more attentional and memory resources to processing and storing such information. This process involves increased focus on visual and spatial details, resulting in more precise representations in working memory, although this does not necessarily increase the number of items recalled (David et al., 2022). Words with negative emotions can reduce global processing bias and increase local processing or details that are supportive and useful for performing visuospatial sketchpad tasks (Kalanthroff, 2023).

CONCLUSION

The results of this study indicate a significant effect of providing emotional words (positive, negative, or neutral) on participants' visuospatial sketchpad working memory abilities. Post-hoc tests showed a significant difference between the negative and neutral groups, supporting the negativity bias theory, which states that humans tend to remember negative information more easily than positive or neutral information. Based on these findings, this study has several limitations. The subjects were college students aged 18 to 23, meaning this study cannot be generalized to a broader population. Most participants were female. The researchers recommend that future research include a wider age range and a balance between male and female participants. Furthermore, they recommend that future data collection be conducted simultaneously, for example in a computer lab or by providing all participants with laptops. The laptops must be kept clean and free of any distractions except for the test materials. This aims to minimize extraneous variables. Future researchers are expected to test other words beyond those listed in the research instrument. Further research should conduct more rigorous research, such as determining the IQ of the respondents.

ACKNOWLEDGEMENTS

We would like to express our gratitude to all participants who were willing to participate in this research until the end and to the campus that facilitated our research.

BIBLIOGRAPHY

Baddeley, A. D., & Hitch, G. (1974). Working memory. *Psychology of learning and motivation*, *4*(11), 417–423.

David, R., Singh, S., Ribeiro, N., & Gomes, D. (2022). Does Spirituality Influence Happiness and Academic Performance? *Religions*. https://doi.org/10.3390/rel13070617

Eichenbaun, H. (2017). Memory: Organization and Control. *Annual Review*, *68*, 19–45. https://doi.org/https://doi.org/10.1146/annurev-psych-010416-044131

Fortenberry, D., Jansen, K., & Clark, M. (2013). Positive Affectivity. In *Research Gate* (hal. 1509–1511). https://doi.org/10.1007/978-1-4419-1005-9_977

Garrison, K. E., & Schmeichel, B. J. (2019). Effects of emotional content on working memory capacity. *Cognition and Emotion*, *33*(2), 370–377. https://doi.org/https://doi.org/10.1080/02699931.2018.1438989

Graham, S. M., Huang, J. Y., Clark, M. S., & Helgeson, V. S. (2008). The positives of negative emotions: Willingness to express negative emotions promotes relationships. *Personality and Social Psychology Bulletin*, *34*(3), 394–406. https://doi.org/10.1177/0146167207311281

Johnson, B., & Christensen, L. (2007). *Educational Research: Quantitative, Qualitative, and Mixed Approaches*.

Kalanthroff, E. (2023). Focused on the negative: emotions and visuospatial attention in generalized anxiety disorder. *Anxiety, Stress, & Coping*, *37*, 406–418. https://doi.org/10.1080/10615806.2023.2262398

Kerlinger, F. . (1966). *Foundations of behavioral research* (Holt (ed.)). Rinehart and Winston.

Kirsten C. S. Adam , Laura-Isabelle Klatt , Jacob A. Miller, Marlene Rösner, Keisuke Fukuda, A. K. (2025). Beyond Routine Maintenance: Current Trends in Working Memory Research. *Journal of Cognitive Neuroscience*, *37*(6), 1035–1052. https://doi.org/https://doi.org/10.1162/jocn_a_02298.

Kristen A, L. (2017). The role of language in emotion: existing evidence and future directions. *Science*

Direct, *17*, 135–139. https://doi.org/https://doi.org/10.1016/j.copsyc.2017.07.006

Nadhiroh, Y. F. (2015). PENGENDALIAN EMOSI (Kajian Religio-Psikologis tentang Psikologi Manusia). *JURNAL SAINTIFIKA ISLAMIC*, *2*(1), 53–63.

Sianipar, A., van Groenestijn, P., & Dijkstra, T. (2016). Affective meaning, concreteness, and subjective frequency norms for Indonesian words. *Frontiers in Psychology*, *7*. https://www.frontiersin.org/articles/10.3389/fpsyg.2016.01907

Wang, L. (2025). Research Progress of Memory Mechanism in Cognitive Psychology. *International Journal of Public Health and Medical Research*, *3*(1), 66–72. https://doi.org/https://doi.org/10.62051/ijphmr.v3n1.10

Xie, W., Ye, C., & Zhang, W. (2021). Negative emotion reduces visual working memory recall variability: A meta-analytical review. *Emotion*. https://doi.org/10.31234/osf.io/zj9pc

Xie, W., & Zhang, W. (2016). Negative emotion boosts quality of visual working memory representation. *Emotion*, *16 5*, 760–774. https://doi.org/10.1037/emo0000159