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The Influence of Survival Context and Psychological Markers on Recall

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ABSTRACT

Introduction: Research shows that stimuli rated for their relevance to a survival scenario have a higher recall probability when compared to other deep encoding conditions. This phenomenon, known as survival memory advantage, is a robust finding that has been demonstrated by various experimental manipulations. The current study aimed to examine associations between participants' psychological markers (perceived stress, anxiety, coping, cognitive control, and flexibility) and their memory performance in survival and other encoding conditions (fight, flight, and pleasantness).

Methods: A total of 141 undergraduates aged 18–35 years participated voluntarily in the study. Four scenario situations (fight, flight, survival, or pleasantness) were randomly allocated to participants, and then they were given a list of words to rate for their relevance to the scenarios. Participants were given a free recall task to measure their memory, while some psychological scales (perceived stress, anxiety level, coping strategies, cognitive control, and flexibility) were administered to assess their psychological markers.

Results: Survival conditions yielded the highest correct recall. Pairwise comparisons showed that difference between survival and pleasant conditions was significant ($p<0.05$). The other conditions did not differ significantly from one another. Regression analyses revealed that anxiety level may explain 13% of variance in survival condition and 14% of variance in fight condition. No significant effect was found on flight conditions.

Conclusion: Recall performance did not significantly differ between survival, fight, and flight conditions. However, anxiety level in survival conditions and support seeking in fight condition were found to be negative predictors of recollection. According to these results, associations between concepts of anxiety and survival, and between support seeking and fight (struggle) in human mind determine memory processes at a significant level. Individuals' psychological characteristics and coping strategies have different effects on recall depending on the context.

Keywords: Anxiety, coping, recall, survival, psychological markers, stress

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INTRODUCTION

A growing body of literature discusses the fact that human memory systems have evolved to address adaptive problems faced by our hunter-gatherer ancestors. Stated differently, human brain has been formed by deep selection pressure traces. Throughout the evolutionary past, natural selection and chance have been the two processes that built human cognitive architecture. Therefore, understanding the characteristics of our ancestral environment and its numerous adaptive demands will provide important insights into evolution of the mind.

Nairne et al. (2007) asserted that human memory systems have evolved to remember certain kinds of information that is relevant to survival and fitness (1). This includes knowledge of prospective predators, reliable food sources, or potential mates, which always had higher adaptive value for our predecessors. Nairne et al. (2007) asked participants to imagine themselves stranded in a grassland on foreign land, and over the next few weeks they would have to find food supplies and protect themselves from possible predators (1). It was shown that participants remembered more words than in the other situations (moving, pleasantness) when they were given a surprise memory test to evaluate study words in terms of their relevance to a survival scenario.

Highlights

- **Recall does not significantly differ between fight, flight, and survival conditions.**
- **Anxiety level is a negative predictor of survival memory advantage.**
- **Regarding memory, there is a notable relation between fighting and seeking support.**
- **Individual psychological markers influence memory processes based on the context.**
- **The survival processing has a strong association with feelings of uncertainty.**

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Many investigations have confirmed this survival memory advantage as a robust phenomenon (2,3). According to Nairne & Pandeirada (2010), modern humans, who have a brain legacy from the Stone Age, bear the imprints of ancestral priorities (4). An evolved fear module centered on amygdala automatically and selectively activates fear response and fear learning with certain aversive stimuli in humans as well as monkeys (5). Fearful settings have shaped the human fear module as an adaptive mechanism during human evolution, according to theory.

When participants were compared with fitness-related scenarios, memory advantage appeared in the ancestral (grassland) context rather than the modern one (city) (4). These findings indicate that although both situations stimulate survival instincts, the ancestral evolutionary setting displays a superior memory than the modern context.

So far, many alternative explanations for the proximate mechanism of the survival processing effect have been proposed. For example, increased elaborative processing (6,1), making plans (7), threat (8), arousal (2,8). According to Nairne et al. (2008) survival processing is one of the best encoding methodologies so far identified in memory research (9).

Smeets et al. (2012) tested participants' memory by comparing their recall performance in no-stress and psychosocial stress scenarios (10). The Trier Social Stress Test (11) which consisted of 5-minute speaking and arithmetic activities, was administered to subjects to induce a stressful condition after the processing of the survival and moving scenarios. As a result, stress did not enhance memory performance following survival processing. To our knowledge, this is the only study that investigated the connection between stress and survival context.

Through biological mechanisms, stress helps survival adaptation in challenging situations in primates. Stress mediators (e.g., glucocorticoids) provide adaptation to stressful situations by guiding cognitive processes and behaviors (12). The fight-or-flight response mechanism, which manifests itself physiologically in mammals under stress, including pressure or threat, was initially defined by Canon (13). A fundamental urge to get away from stimuli drives these acute reactions. Ethologists have identified four basic reactions to fear using Jeffrey A. Gray' sequence (14). These include freeze (also known as "stop, watch, and listen"), flight, fight, or fright (also known as "playing dead").

Stress has significant effects on memory functioning. Depending on the stage of the process, stress hormones can affect learning and memory in different ways. Previous experimental studies showed that while stress hormones contribute to post-learning memory performance of emotional material, they have a disruptive effect when released during retrieval process (15). On the other hand, some research results regarding anxiety and memory seem to be contradictory. In research by Kizilbash et al. (2002), high levels of anxiety had no negative effects on any aspects of memory processing (16).

Despite having similar psychological and physiological features, stress and anxiety are distinct from one another because stress involves both avoidant and proactive reactions (17). The term "coping" refers to cognitive or behavioral strategies used to respond to pressures that exceed one's capacity. People attempt to reduce stress via coping, which involves some strategies such as eliminating stressors, managing negative emotions, and gaining inner balance (18). With a theoretical distinction between two adaptive coping strategies (emotion-focused and problem-focused coping), Lazarus & Folkman's (1984) article demonstrates several psychological patterns (19). According to this distinction, the goal of emotion-focused coping is to regulate how stressful situations are perceived and dealt with. On the other hand, problem-focused coping aims to remove stressors by addressing the problem's root cause through a critical and insightful evaluation.

Coping strategies are divided into two categories: adaptive and maladaptive coping. Adaptive coping involves methods for proactively addressing stressful circumstances and finding solutions. On the other hand, maladaptive coping includes avoidance-focused behavioral patterns. Strategies such as acceptance, humor, seeking social support, and positive reinterpretation are a few examples of emotional-based coping (18). Situation management, actively struggling, focusing, and planning are a few examples of problem-based coping mechanisms.

The aim of the current study is to investigate associations between memory performance under different encoding circumstances (survival, fight, flight, and pleasantness) and psychological measurement scores (stress, anxiety, stress coping, and cognitive control). Even though numerous studies have demonstrated the robustness of the survival processing effect, there has been no research comparing the standard survival scenario of Nairne et al. (2007) with the concepts of fight or flight (1). We investigated whether there were any notable differences between the survival condition and the other types of survival (fight or flight) in terms of recall function. We also examined connection between recall and psychological characteristics. It was anticipated that survival context would have a memory advantage over other encoding settings based on prior research findings, and that this advantage would be strongly influenced by variables like anxiety level and coping strategies.

METHODS

Participants

A total of 141 undergraduates (105 females and 36 males) participated voluntarily in the study. The sample age ranged from 18 to 30 years old (M_{age}=20.35, SD=1.91). Data were gathered from two universities in Türkiye. All participants had to fulfill some inclusion criteria, such as being between 18 and 35 years of age, being a native Turkish speaker, and not currently undergoing psychological or neurological treatment. The data of 23 participants were not included in the analysis due to reasons such as withdrawal from the study, use of psychological medication, not following the instructions, being over 35 years of age, and not being native Turkish speakers.

Materials

A list of 53 words drawn from the updated Battig and Montague category norms was used for the recall task (20). The study words came from this category norm list, which is the same list that Nairne et al. (2007) utilized in their experiment (1). Each word was selected from higher-ranking words that were the best representative of categories in the norm table; for example, a carpenter's tool –*hammer*; a natural earth formation –*sea*. For the memory task, 53 Turkish words were used.

Psychological Measurements

Perceived Stress (PS): 14-item perceived stress scale (PSS) was designed by Cohen et al. (1983) to determine people's perceptions of stress about their life events (21). Perceived stress scale was also found to be a good predictor of health-related issues. Respondents make decisions on each item by using a 5-point Likert scale (0 "*never*" to 5 "*very often*"). Higher scores indicate a high level of stress experienced by the person. The standardization of the scale was conducted by Eskin et al. (2013) (22). Researchers reported that both the long and short forms of the scale have high validity and reliability. The Cronbach alpha reliability coefficient of the scale was 0.84.

Anxiety: Beck anxiety inventory (BAI) was used to determine the anxiety level of individuals. This 21-item inventory was created by Beck et al. (1988) to evaluate the frequency of a person's anxiety symptoms (23). A high score on the scale shows a high-level anxiety experienced by the

person. The standardization of the inventory was performed by Ulusoy et al. (1998) (24). The inventory's Cronbach alpha reliability coefficient was 0.93.

Coping with Stress (CS): To measure the cognitive and behavioral coping strategies of individuals in stressful situations, a 23-item scale was developed according to Lazarus & Folkman's (1984) model (19). This model has two dimensions: emotion-oriented and problem-oriented approach. The Coping with Stress Scale (CSS), developed based on this model by Türküm (2000), was used in this study (25).

The coping with stress scale (CSS) was developed in a Turkish sample based on the Folkman & Lazarus Questionnaire (1988) (26). Originally, eight coping mechanisms were listed in the ways of coping questionnaire of Folkman & Lazarus (1988): confrontive coping, distancing, self-controlling, seeking social support, accepting responsibility, escape-avoidance, planful problem-solving, and positive reappraisal (26). CSS consisted of three subscales: *CS-Planful Problem Solving* (CS-PPS), *CS-Avoidance* (CS-A), and *CS-Seeking Social Support* (CS-SSS). The Cronbach's alpha coefficients for these subscales were reported as 0.85.0.80, and. 65, respectively. Participants make their assessments by using a 5-point Likert scale (1"*not suitable at all*" to 5 "*completely suitable*"). In the current study, these three coping strategies were examined separately as well as in relation to other variables.

Cognitive Control and Flexibility (CCF): It measures participants' degree of flexibility and control over their thoughts and feelings in stressful situations. Respondents are required to make decisions about their thoughts and emotions in stressful situations by using a 7-point Likert scale (1*"I totally disagree"*, 7*"I totally agree"*). The standardization of the scale was done by Demirtaş (27). The Cronbach alpha coefficients ranged between 0.85 and 0.91.

Procedure

The study was conducted in groups of maximum 20 people. They were first given a detailed explanation of the procedure before being asked to sign a written informed consent form. After they completed a demographic information form, the recall task was performed on the computer. Each participant was randomly allocated to one of the four written situations (fight, flight, survival, and pleasantness), and they were told to imagine the given scenario in their minds. Participants in the survival condition (n=37) had to forage for food and drink on grasslands while protecting themselves from predators. Participants in the fight condition (n=35) had to fight against predators, while those in the flight condition (n=37) had to avoid them. In the pleasantness condition, participants (n=32) were asked to rate the words' level of pleasantness. The survival and pleasantness scenarios of Nairne et al. (2007) were used after being translated into Turkish (1). The fight and flight scenarios were produced by us in for this research.

The scenarios are as follows:

Survival. In this task, we would like you to imagine that you are stranded in the grasslands of a foreign land without any basic survival materials. Over the next few months, you will need to find steady supplies of food and water and protect yourself from predators. We are going to show you a list of words, and we would like you to rate how relevant each of these words would be for you in this survival situation. Some of the words may be relevant and others may not; it is up to you to decide.

Fight. In this task, we would like you to imagine that you are stranded in the grassland of a foreign land. Over the next few months, you will survive in this place. You also notice the presence of many predators around you. You realize that to survive in this place, you have to fight against them and overcome them. You do not have the tools necessary for this purpose. We are going to show you a list of words, and we would like you to rate how relevant each of these words would be for you in this situation. Some of the words may be relevant and others may not; it is up to you to decide.

Flight. In this task, we would like you to imagine that you are stranded in the grassland of a foreign land. Over the next few months, you will survive in this place. You also notice the presence of many predators around you. You realize that to survive in this place, you need to avoid and protect yourself. You do not have the tools necessary for this purpose. We are going to show you a list of words, and we would like you to rate how relevant each of these words would be for you in this situation. Some of the words may be relevant and others may not; it is up to you to decide.

Pleasantness. In this task, we are going to show you a list of words, and we would like you to rate the pleasantness of each word. Some of the words may be pleasant and others may not; it is up to you to decide.

Stimuli were presented via a projector, focused on the screen, following the stage of reading and scenario-imagining. One projector was used to project slides containing the study words for the participants in the classroom. During the word presentation, participants had to rate each word for its relevance to the given scenario using a Likert scale (1*"totally irrelevant")* or (5*"totally relevant"*). For their assessment, participants were asked to make markings on a response sheet. Participants in the pleasantness condition were asked to rate the degree of pleasantness of each word using a 5-point Likert scale (1 *"totally unpleasant"*) or (5 *"totally pleasant"*). Following encoding and rating phases, participants were given an interference task that lasted for approximately four minutes. Ten numbers, ranging from 0 to 9, were gradually given to participants in this task. They were then told to write down the numbers they remembered in the right order on response sheet. Next, participants completed a free recall test for words that had previously been presented. The recall task proceeded for five minutes. After that, the psychological scales were applied. The data was collected in nine sessions.

Statistical Analyses

After preliminary statistics, further analyses were applied to the data. To analyze the connections between stress, anxiety level, coping strategies, cognitive control, flexibility, and recall across experimental conditions, one-way ANOVA, Pearson correlation, stepwise regression analyses were applied to the data. IBM Statistical Package for Social Sciences (SPSS) program version 23.0 was used for all analyses. The alpha level for significance was accepted as $p < 0.05$ at a 95% confidence interval.

This study gained ethical committee approval from the Isparta Süleyman Demirel University Clinical Research Ethics Committee. The approval was granted on March 23, 2022 and was given the reference number 7/98. Informed consent was obtained from all participants.

RESULTS

Preliminary Analyses

The number of correctly recalled words in four encoding conditions (fight, flight, survival, and pleasantness) was analyzed for normality, homogeneity, univariate, and multivariate outliers. After removing univariate and multivariate outliners (two participants) from the dataset, the analysis was carried out for 141 students. The data satisfied the assumptions of Tabachnick & Fidell (2012) about normality, linearity, and homoscedasticity (28). Table 1 displays means, standard deviations, skewness, and kurtosis values belonging to recall scores.

The dataset from the psychological measurements was further examined for normality, linearity, univariate and multivariate outliers, and multicollinearity for the fight, flight, and survival scenarios. A multiple ANOVA was applied to compare means of each independent variable (anxiety, PS, CS-PPS, CS-A, CS-SSS, and CCF) between three encoding conditions (fight, flight, and survival). No significant difference was found between these three encoding conditions: anxiety [F (2,100)=0.61, p>0.05]; PS [F (2,100)=0.02, p>0.01]; CS-A [F (2,100)=0.80, p<0.05]; CS-PPS [F (2,100)=1.29, p>0.05]; CS-SSS [F (2,100)=1.61, p>0.05]; CCF [F (2,100)=0.64, p>0.05].

Recall Performance

The memory performance under encoding conditions was evaluated using a one-way ANOVA. The findings of Levene's test showed that there was no difference between the group variances [F (3,137)=1.44, p>0.05]. One-way ANOVA results showed that there was a significant main effect between encoding conditions [F (3,137)=2.68, p<0.05, η_p^2=0.6]. The highest correct recall was obtained in the survival condition (Figure 1). Bonferroni multiple comparisons indicated that correct recall in the survival condition ($M_{survival}$=15.49, SD=4.13) was significantly greater than in the pleasantness condition ($M_{pleasantness}$=12.41, SD=4.12; p<0.05). No significant difference was found between other conditions (M_{fight}=13.89, SD=5.25; M_{flight}=14.00, SD=4.45).

Bivariate Correlations

Pearson correlation analysis was used to analyze the data obtained from the psychological scales. Descriptive statistics and correlations for variables are presented in fight (Table 2), flight (Table 3) and survival (Table 4).

Regression Analyses

To determine the effect of predictors (PS, anxiety, CS-PPS, CS-SSS, and CCF) on recall performances in fight, flight, and survival conditions, multiple regression analyses were conducted on the data. Stepwise multiple regression analyses revealed that anxiety level (β=–0.36, p<0.05) in regression Model 1 [F (1,34)=4.98, p<0.05] significantly predicted recollection in survival condition (13%), and CS-SSS (β=-0.37, p<0.05) in Model 2 [F (1,34)=5.25, p<0.05] significantly explained memory performance in the fight condition (14%). No significant effect was found for flight condition. Table 5 displays the significant results.

Table 1. Means, standard deviations, skewness, and kurtosis values of recall scores

Variables	M	SD	Skewness	Kurtosis	n
Fight	13.89	5.25	0.13	-0.34	35
Flight	14.00	4.45	0.01	-0.40	37
Survival	15.49	4.13	-0.29	0.23	37
Pleasantness	12.41	4.12	0.26	-0.43	32

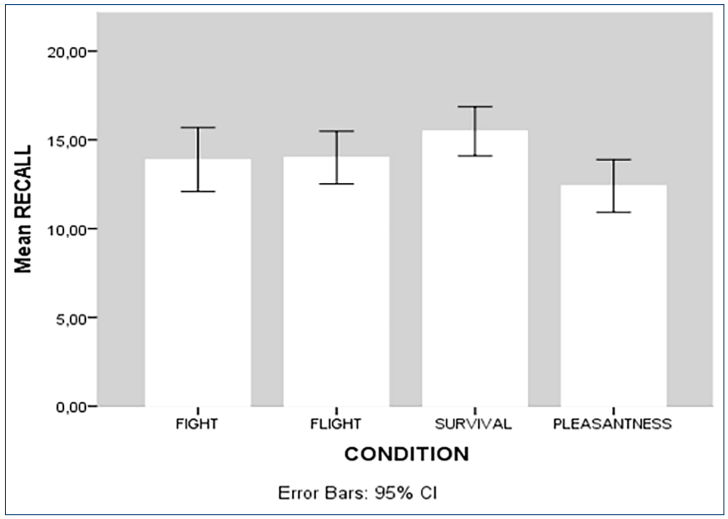

Figure 1. Mean numbers of correct recall in encoding conditions (error bars show the standard errors of the means).

Table 2. Descriptive statistics and correlations for study variables in fight condition

Variable	n	M	SD	1	2	3	4	5	6	7
Fight	35	13.88	5.25	-						
PS	35	25.29	7.47	0.09	-					
Anxiety	35	18.86	14.88	-0.01	0.42*	-				
CS-A	35	24.54	5.01	-0.35*	-0.35*	0.02	-			
CS-PPS	35	30.11	5.56	-0.22	-0.37*	-0.35*	0.43**	-		
CS-SSS	35	23.80	7.38	-0.37*	-0.10	-0.11	0.26	0.08	-	
CCF	35	76.54	21.82	-0.18	-0.52**	-0.52**	0.09	0.60**	0.01	-

PS: Perceived Stress; CS-A: Stress Scale-Avoidance; CS-PPS: Stress Scale-Planful Problem Solving; CS-SSS: Stress Scale--Seeking Social Support; CCF: Cognitive Control and Flexibility.
*p<0.05, **p<0.01, ***p<0.001

Table 3. Descriptive statistics and correlations for study variables in flight condition

Variable	n	M	SD	1	2	3	4	5	6	7
Flight	38	13.74	4.68	-						
PS	38	25.87	6.80	-0.01	-					
Anxiety	38	19.18	12.63	-0.09	0.26	-				
CS-A	37	25.62	5.23	-0.32	-0.19	0.17	-			
CS-PPS	37	31.38	4.66	-0.11	-0.34*	-0.07	0.05	-		
CS-SSS	37	26.30	5.39	-0.15	-0.13	-0.45**	-0.07	-0.01	-	
CCF	37	80.14	18.43	-0.20	-0.65**	-0.29	0.09	0.49**	0.06	-

PS: Perceived Stress; CS-A: Stress Scale-Avoidance; CS-PPS: Stress Scale-Planful Problem Solving; CS-SSS: Stress Scale--Seeking Social Support; CCF: Cognitive Control and Flexibility.
*p<0.05, **p<0.01, ***p<0.001

Table 4. Descriptive statistics and correlations for study variables in survival condition

Variable	n	M	SD	1	2	3	4	5	6	7
Survival	38	15.21	4.42	-						
PS	38	25.90	8.36	-0.31	-					
Anxiety	36	15.31	10.72	-0.35*	0.69**	-				
CS-A	35	25.80	5.83	-0.22	-0.04	0.00	-			
CS-PPS	35	31.74	4.82	-0.09	-0.34*	-0.13	0.56**	-		
CS-SSS	35	23.86	6.90	0.16	-0.41*	-0.29	0.37*	0.34*	-	
CCF	37	80.03	16.92	0.07	-0.65**	-0.45**	0.27	0.64**	0.22	-

PS: Perceived Stress; CS-A: Stress Scale-Avoidance; CS-PPS: Stress Scale-Planful Problem Solving; CS-SSS: Stress Scale--Seeking Social Support; CCF: Cognitive Control and Flexibility.
*p<0.05, **p<0.01, ***p<0.001

Table 5. Stepwise multiple regression analysis results predicting recall performance in fight, flight, and survival conditions

Variable	Model 1			Model 2		
	B	β	SE	B	β	SE
Constant	17.47***		1.28	20.15***		2.86
Anxiety[a]	-0.15*	-0.36	0.07			
CS-SSS[b]				-0.26*	-0.37	0.12
R^2	0.13			0.14		
ΔR^2	0.11			0.11		

CS-SSS: Stress Scale--Seeking Social Support
*p<0.05, **p<0.01, ***p<0.001, [a]Survival, [b]Fight condition

DISCUSSION

This study focused on how memory and psychological markers relate to each other in fight, flight, and survival situations. The research findings were inconsistent with our expectations, even though an ANOVA revealed a significant effect of condition on recall (p<0.05). The survival condition had the highest retrieval rate, despite the fact that there was no statistically significant difference between the survival, fight, and flight conditions. Post hoc analyses showed a significant difference only between survival and pleasantness (control condition). These results imply that survival processing has a retrieval superiority over the other conditions.

According to Nairne & Pandeirada (2010), ancestral priorities have an important place in human cognition (4). It is plausible that modern humans' cognitive functions still exhibit evolutionary predispositions. Nairne & Pandeirada (2010) claim that the survival scenario has a memory advantage because it matches ancestral priorities (4). This viewpoint holds that human memory systems evolved to solve adaptive problems. Various perspectives were offered to comprehend proximal mechanism of the survival processing effect. Some authors suggested that rich, elaborative, and distinctive encoding nature of survival processing improves retention of stimuli (6,1).

Kostic et al. (2012) observed survival advantages for situations in grasslands, deserts, jungles, lost at sea, and lost in outer space (29). They asserted that survival memory advantage appears to be independent of the ancestral habitat and generalizable to a variety of survival circumstances. These results suggest that neither specific sources of perceived risk nor evolutionarily relevant physical environments (grasslands) are necessary for the mnemonic benefit of survival processing.

A meta-analysis study by Tay et al. (2019) showed that the survival memory advantage arises in the presence of threats (predators), independent of the environment (savannah or grassland), and that the context of the grassland contributes additively to the survival effect (30). Why such a memory advantage does not occur in the other scenarios could be explained by the lack of threats. The lack of statistically significant differences between fight, flight, and survival circumstances in

the current investigation raises the possibility that the survival threats in all three situations might be the same. The only significant difference was found between survival and pleasantness.

These results indicate that survival processing has a robust and special mechanism. And they may provide us with insights into the mechanism of this survival advantage. One may contend that the survival context is the reason behind participant's ambiguity on "what to do." Although fight and flight scenarios are similar as forms of survival, they both direct individual towards a certain behaviour. In comparison to the survival scenario in this study, neither of them attained a higher recall success rate. It is possible that participants' uncertainty about what to do in survival scenario may lead to a memory advantage.

When predators and zombie settings in the grassland and modern city scenarios were contrasted zombie scenarios had the highest recall rates (8). Participants who were exposed to zombie scenarios (city zombies, grassland zombies) recalled considerably more words than those who were exposed to other scenarios (city attackers, grassland predators). Surprisingly, zombie threats created a greater memory advantage. These results raise questions about the function of ancestral priorities in the survival memory advantage.

According to the current study, regardless of the physical context, memory advantages are more likely to happen in scenarios where there is a higher level of uncertainty. Survival context's uncertainty might prompt a variety of rich, probabilistic mental connections, which helps people encode and retain more words. Conversely, we assert that zombie scenarios can produce more uncertainty than survival scenarios. This tendency may help to explain why zombie scenarios had a memory advantage over survival scenarios (8). We need further research on these viewpoints.

Anxiety level was found to be a major predictor of recall in survival situation, but not in fight and flight scenarios. There is an inverse relationship between anxiety level and survival. On the memory test, participants in the survival group –who typically exhibit lower levels of anxiety– performed better than those in the other circumstances. However, Smeets et al. (2012) could not find a significant distinction between stress-induced and no-stress conditions in terms of survival advantage (10). This finding shows that stress is not one of the possible proximate processes of survival memory advantage. The current study indicated that anxiety level, not stress, was directly associated with survival advantage. It demonstrates that these outcomes most likely depend on encoding context and highlights the significance of cognitive context in the human mind.

Remarkably, when stress coping mechanisms were considered, significant outcomes were observed only in fight condition. Avoidance is considered an emotionally maladaptive coping strategy, whereas seeking social support is regarded as an adaptive coping. In terms of memory function, help-seeking and fight notions are significantly related. This implies that those with a lesser inclination to seek assistance have a better recall performance than people with a higher inclination during fighting circumstances. However, no significant indicators were found for survival or flight. It means that in an environment where fighting is valued, people who are more likely to seek help from other people in stressful situations are less mentally oriented to that situation. Contextual characteristics may impact people's cognitive functions and interact with their psychological states.

There are several limitations on this study. Firstly, the number of women and men in the study is not balanced. The higher involvement rate among women can be attributed to the challenges in recruiting male volunteers. Secondly, the findings' generalizability is further constrained by the sample's restriction to undergraduate students. Future research should use a range of sample sizes.

In summary, survival processing plays a crucial role in memory function and serves as an embedded trigger in the human mind. According to this study, survival memory advantage is produced by participants' feelings of uncertainty about what to do in a survival situation. The ultimate mechanism of survival processing, as well as its proximate causes, are still up for debate. It is necessary to generate new perspectives on this phenomenon in the future research. This study also demonstrates the inverse association between memory function and anxiety as well as seeking out social support. These results highlight the impact of context on the connection between psychological variables and memory functions.

Ethics Committee Approval: This study gained ethical committee approval from the Isparta Süleyman Demirel University Clinical Research Ethics Committee. The approval was granted on March 23, 2022 and was given the reference number 7/98.

Informed Consent: Informed consent was obtained from all participants.

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