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Yoqutxon Sobirjonova
Student
The University of World Economy and Diplomacy
Tashkent, Uzbekistan
fotimaholiknazarova@gmail.com

THE IMPACT OF CHRONIC STRESS ON SHORT-TERM AND LONG-TERM MEMORY

Abstract. This paper examines how stress influences people's ability to remember information. By reviewing scientific studies and analyzing a survey of 40 participants, the research shows that high or long-lasting stress makes it harder to focus, store new information, and recall past experiences. Many participants reported forgetfulness and reduced concentration during stressful periods. The findings suggest that learning healthy ways to manage stress—such as rest, physical activity, and relaxation—can help protect memory and support better daily performance.

Key words. Chronic stress; memory retrieval; short-term memory; long-term memory; cortisol; prefrontal cortex; hippocampus; cognitive performance; stress management; working memory; attention; coping strategies; Sympathetic Nervous System (SNS); Hypothalamic–Pituitary–Adrenal (HPA) axis; cognitive impairment.

Stress is an inevitable part of human life and has a strong influence on how people think, feel, and remember. In recent years, researchers have become increasingly interested in how stress affects memory retrieval, as this process is crucial for daily functioning, learning, and performance. While moderate stress can

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sometimes sharpen attention and aid memory formation, intense or prolonged stress is known to disrupt the ability to recall information.

Memory retrieval is particularly sensitive to the timing and type of stressor. For instance, stress that occurs immediately before a memory task often impairs recall, especially when cortisol—the main stress hormone—is released in high amounts. Laboratory studies typically use methods like the Cold Pressor Test (CPT) or the Trier Social Stress Test (TSST) to simulate such stress. These stressors activate the body in different ways: the CPT triggers a physiological response, whereas the TSST evokes psychological and social pressure.

Understanding how stress impacts memory retrieval is essential not only for academic research but also for real-life situations, such as test anxiety or performing under pressure. This paper reviews existing research on how stress influences memory retrieval, considering factors such as timing, stressor type, and individual differences like sex and age.

Many studies show that stress can strongly affect how people remember information. When a person faces stress, the body releases hormones through two systems — the sympathetic nervous system (SNS) and the hypothalamic–pituitary–adrenal (HPA) axis. The HPA axis releases cortisol, a hormone that can enter the brain and influence areas such as the hippocampus and amygdala, which are responsible for memory and emotions. High levels of cortisol can change how memories are stored and recalled.

Timing of Stress

The time when stress happens plays an important role. Stress before learning may help a person remember better because it increases attention, but stress before recalling information often makes memory worse. Schwabe and Wolf (2010) found that if stress occurs 15–45 minutes before a memory test, recall performance usually drops. This shows that stress mainly disrupts the retrieval stage of memory.

How Stress Works in the Brain

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When cortisol levels rise, they affect how the hippocampus retrieves stored information. Roozendaal and Joëls et al. explained that cortisol temporarily blocks access to already learned information. This explains everyday experiences such as forgetting information during stressful exams (Wolf, 2009).

Types of Stress

Researchers use several laboratory tests to cause stress. The Trier Social Stress Test (TSST) is the most common one. It includes public speaking and mental math in front of an audience, which causes strong social stress and a big increase in cortisol (Kirschbaum et al., 1993). Other tests like the Cold Pressor Test (CPT) or Socially Evaluated Cold Pressor Test (SECPT) use physical discomfort such as cold water, but they create weaker stress responses (Schwabe et al., 2008). This shows that social stress affects memory more than physical stress.

Individual Differences

Not everyone reacts to stress the same way. Younger people, especially men, usually show stronger cortisol responses and greater memory problems than older adults (Kudielka&Kirschbaum, 2005). This may be because older people have fewer or less sensitive cortisol receptors in the brain (Otte et al., 2005). Women's memory can also be affected by hormonal cycles. Women in the luteal phase or using contraceptives tend to show less memory disruption (Andreano&Cahill, 2009).

Recent studies show that how we learn also affects how stress influences memory. Practicing retrieval — for example, testing yourself instead of rereading — helps protect memory from stress (Smith et al., 2016). This means good study strategies can reduce stress-related memory loss, which is useful for students and professionals. Overall, most studies agree that acute stress before recalling information impairs memory, especially in social or evaluative situations.

Methodology

This research followed a literature review approach to examine how stress influences memory retrieval. The study involved analyzing 11 peer-reviewed

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journal articles and reviews published between 2015 and 2024, focusing on the effects of acute and chronic stress, cortisol levels, and memory performance.

The materials were selected from reliable academic databases such as **PubMed, ScienceDirect,** and **Google Scholar** using keywords like stress, cortisol, memory retrieval, and cognitive performance.

Research shows that chronic stress negatively influences short-term or working memory. Continuous exposure to stress hormones, especially cortisol, disrupts the activity of the prefrontal cortex, which manages attention and temporary information storage (Lupien et al., 2009). Studies suggest that when cortisol levels remain high for a long time, people have more difficulty focusing, updating information, and performing mental tasks quickly (Schoofs et al., 2008). As a result, chronic stress can cause forgetfulness and poor concentration in everyday situations.

Chronic stress also has damaging effects on long-term memory. Prolonged cortisol release harms neurons in the hippocampus, the brain region responsible for storing and retrieving long-term memories. Over time, this can lead to reduced ability to recall past experiences or learn new information. Research by Vogel and Schwabe (2016) found that constant stress changes how memories are processed—shifting from flexible, detailed recall to more rigid, habit-like patterns. This means that chronic stress not only weakens long-term memory storage but also changes the way information is retrieved.

A total of 40 participants took part in the survey examining the effects of chronic stress on short-term and long-term memory. Most respondents were university students aged 18–25, with a few participants under 18 and several working professionals. The majority of respondents reported experiencing moderate to high stress levels (3–5 on a 5-point scale), with the most common causes being academic or work pressure (45%), financial difficulties (20%), and relationship or family problems (25%).

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When asked about short-term memory lapses such as forgetting simple daily tasks or losing concentration, over 70% of respondents admitted that these issues became more frequent during stressful periods. Many participants stated that stress made it harder to concentrate (80%) and often caused them to forget simple daily tasks (65%). This supports previous research suggesting that stress temporarily disrupts attention and working memory (Schwabe&Wolf, 2010). Respondents described feeling “mentally exhausted” and “unable to focus for long periods,” particularly during exam seasons or periods of emotional strain.

Regarding long-term memory, about 60% of respondents reported difficulty recalling previously learned information during or after stressful periods. Several mentioned that their academic or work performance declined, consistent with findings by Kim&Diamond (2002) and McEwen&Sapolsky (1995), which linked chronic stress to hippocampal impairment and memory retrieval issues. Approximately 45% noticed a long-term decline in memory retention after prolonged stress exposure, especially among students dealing with months of continuous pressure.

In terms of coping, the most common strategies were exercise (40%), meditation or relaxation (35%), and taking breaks or sleeping (50%). A smaller portion mentioned talking to others (30%), while a few respondents (10%) stated they did not use any coping strategies. Notably, 85% of participants agreed that learning more about stress management could help improve memory and focus, highlighting the importance of psychological education and wellness support among students.

Discussion

This study showed that chronic stress negatively affects both short-term and long-term memory. Most participants said they often feel stressed because of school, work, or personal problems. Many also reported that stress makes it harder for them to focus, remember things, and perform well in studies or daily life. These findings match previous research, which says that long periods of stress increase

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the hormone cortisol, and this can harm the parts of the brain that control memory, such as the hippocampus and prefrontal cortex.

In this research, short-term memory problems were more common than long-term ones. This means that stress first affects our ability to concentrate and keep information for a short time. When stress continues for a long period, it can also weaken our ability to store and recall information later. Earlier studies by scientists like Lupien et al. (2009) and Schwabe and Wolf (2010) also found similar results.

Participants in the survey used different ways to cope with stress. Many said they try to relax, take breaks, sleep, or exercise, which are all known to help reduce stress. Some participants, however, said they do not have any clear way to manage stress. This shows that more awareness is needed about healthy ways to deal with pressure, especially for students and young adults.

These results are important for education and everyday life. When people learn how to control their stress, they can improve their memory, focus better, and perform more successfully in school or work. Future programs that teach stress management could help many people protect their mental health and memory.

Summarize. This study showed that stress, especially when it lasts for a long time, can strongly affect how well people remember things. Most participants said that stress often makes them lose focus, forget small details, or struggle to recall what they have learned. These findings match what many scientists have discovered — that high levels of the stress hormone cortisol can interfere with how the brain processes and retrieves information.

Short-term memory seems to be the first to suffer. When people are stressed, they may find it hard to pay attention or hold information in mind, such as when studying for an exam or finishing a task under pressure. If this stress continues for a long time, it can also begin to weaken long-term memory, making it harder to remember things that were once clear.

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At the same time, this study gives some hope. Many participants said that taking breaks, getting enough rest, or doing physical activity helped them manage their stress. These small steps can make a big difference. They remind us that while stress is a normal part of life, it does not have to control our minds or our memories. Learning healthy ways to cope — like exercise, mindfulness, or talking to others — can protect both our memory and mental well-being.

Overall, understanding how stress affects memory can help students, teachers, and professionals make better choices in managing their daily lives. If people learn to care for their mental health as much as their physical health, they can think more clearly, remember better, and feel more confident even in stressful times.

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