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Dissociative Identity Disorder and Broken Memories

ABSTRACT

Background

Dissociative identity disorder (DID) significantly impacts memory processing and brain function, leading to memory gaps, amnesia, and separate neural activation patterns between alters.

Objectives

This study explores the cognitive and neurological impacts of DID, specifically on how different alters display different brain activity and how these differences alter and prevent memory encoding, recall, and integration between alters.

Methods

By using PubMed and Google Scholar, a total of 5 studies were reviewed for this paper.

Results

The studies used in this paper reveal that traumatic alters often display heightened activity in areas that deal with sensory and motor processing, while normal alters use different neural patterns altogether. The impaired memory transfer between alters results in memory gaps and inconsistencies, which have been found to be caused by structural and functional brain differences.

Conclusion

This research highlights the impact that DID has on memory and neural processes, highlighting the need for continued research and new, more effective treatments to better the lives of DID patients.

INTRODUCTION

Dissociative identity disorder (DID) patients regularly experience memory gaps and fragmentation, along with cognitive impairments, making their daily lives harder than they already are [1].

DID patients often have two distinct personality types: normal and emotional or traumatic [2]. The normal alter commonly functions during "day-to-day" life, while the traumatic alter is associated with memories, emotions, and experiences of past trauma [2]. Despite having two personality types, it is common for DID patients to have more than two alters [2].

Historically, dissociative identity disorder has been overlooked, misunderstood, and not thought of as a mental health disorder [1, 2]. However, due to recent technological advancements, such as MRIs, fMRIs, and other brain imaging techniques, evidence regarding brain differences in neural pathways between alters, and DID vs regular patients has come to light [5]. Evidence shows that a major brain difference between DID and normal patients is the size of their hippocampus -the region of the brain associated with memory function [4]. It has been found that the hippocampus of a DID patient's brain is significantly smaller than that of a normal patient's brain, suggesting a major reason for a loss of memories as well as memory fragmentation and gaps [4].

This study aims to synthesize the findings of multiple research papers to explore how dissociative identity disorder impairs memory processes and brain function. Specifically, it looks at the different neural patterns behind alters as well as the impact of DID on the encoding and recall processes of memories and memory fragmentation. By using a combination of fMRI studies, clinical memory tests, and patient reports, this paper looks into the neurological and psychological basis of DID. These findings aim to improve the understanding the general public has, reduce stigma, and aid researchers and scientists in improving the lives of those who suffer from dissociative identity disorder.

METHODS

This study was a systematic review of studies that explored how DID impacts memory. Both Google Scholar and Pubmed were used to find information for this paper. Keywords were DID, memory loss, amnesia, and memory fragmentation. English articles that focus on memory fragmentation in relation to DID were referenced in this paper while non-English articles and review articles were excluded.

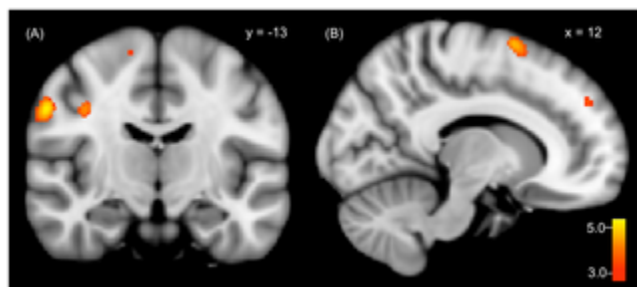
RESULTS

Table 1 summarizes the key findings, main idea, and importance of each study on the impact of DID on memories. These studies were used as they focused on brain pattern activation between different alters, memory transfer, as well as fMRI scans of DID patients, all of which are necessary to look at when trying to understand how DID impacts memory processing.

Table 1. Summary of studies on memory and brain function in patients with dissociative identity disorder (DID)

Study	Focus	Key Findings	Relevance to Research Question
Reinders et al. (2003) [3]	Patterns of brain activation in alters	Brain activity between traumatic and normal alters greatly differs, suggesting emotional responses to traumatic memories also differ between types of alters.	Helps to explain how DID alters impact and often leads a different memory processing, affecting storage and recall
Peters et al. (1998)[4]	Memory transfer between alters	DID patients displayed significant memory impairment when trying to recall memories and when switching between alters.	Displays that memory does not transfer properly between alters, adding to memory gaps
Schlumpf et al. (2013) [5]	Resting-state brain activity in patients with DID	Identified patterns of brain activation in normal and emotional alters in response to external stimuli	Displays how different DID alters utilize different parts of the brain, potentially impacting memory recall and processing
Vissia et al. (2022)[2]	Lack of neural activity during memory-related tasks	DID patients experience less activation in the parietal lobe when completing tasks related to attention and memory	Explains the lack of brain activation in areas that aid in memory encoding in patients with DID, leading to an overall lack of memories.
Van der Hart et al. (2005)[1]	Loss of memory in DID patients	DID patients often experience memory gaps or amnesia in between alters	Supports the argument that memory loss is a key DID symptom

Figure 1: fMRI of DID brain activity



fMRI scans display a significant increase in regional cerebral blood flow in the emotional or traumatic alters' brains compared to the normal alters brains. The emotional alter displays increased activation of areas that deal with processing sensory information and motor activity while the normal one appears stable [5].

The studies used in this review paper highlight the major impact that dissociative identity disorder has on memory and brain function, particularly on how DID patients recall and process memories. Table 1 displays how the research supports the theory that memory loss, gaps, and fragmentation are all incredibly common in patients with DID. The first study explained that brain activity significantly differs between traumatic (emotional) and normal alter, with traumatic alters displaying lower amounts of regional cerebral blood flow when exposed to traumatic memories, events, and ideas, indicating a changed pattern of memory processing [3]. This supports the hypothesis that the areas of the brain that are involved in memory recall are altered when switching between alters, causing memory gaps [3].

Similarly, Peters et al. (1998) found that patients with DID struggled with transferring memories between alters [4]. These findings highlight the difficulty in memory combination and integration across alters and further explain the amnesia-like symptoms that patients with DID often report. This aligns with the findings of Van der Hart et al. (2005), who saw that memory fragmentation is a key symptom of DID, with patients being unable to recall significant life events, usually during dissociation [1].

When specifically looking at brain activity, Schlumpf et al. (2013) provided evidence that different alters utilize different regions of the brain [5]. The traumatic or emotional alter had a more active prefrontal cortex and sensory-motor areas of the brain, suggesting that the traumatic alters may rely more on these regions, possibly because of heightened levels of anxiety due to past trauma [5]. On the other hand, the normal alter showed greater activation in the thalamus, which is used for sensory and motor processing, indicating that the different brain areas may impact memory recall in the presence of an alter [5]. Further research similarly displayed that parts of the brain that are used to encode, process, and create memories did not activate in DID

patients, overall leading to a lack of memory formation and, therefore, memory gaps and amnesia [2].

All the evidence from these studies goes to show that DID disrupts memories, processing, and recall within DID patients [4]. Not only are there differences in the activation of the brain, but the transfer of information between alters is not done properly, leading to memory fragmentation as well as gaps [4]. These findings further support the idea that DID is a mental health disorder that impacts both neural and memory processes.

DISCUSSION

This review synthesizes findings from multiple studies that look into the cognitive and neural functions behind Dissociative Identity Disorder (DID), specifically looking into memories and neural differences between alters. Together, these studies highlight the biological and physiological basis of DID and provide information regarding the massive impact it has on memory, brain activity, and transition between alters.

Neural Differences Between Alters

Studies have displayed distinct patterns of regional cerebral blood flow (rCBF) in traumatic and normal alters when responding to emotion-provoking stimuli [3]. Specifically, the traumatic alters exhibited reduced rCBF levels when exposed to a traumatic story compared to the normal alter [3]. The findings state that specialization within the different regions of the brain allows for different alters to process emotional memories in different ways [3]. The reduced rCBF in trauma-related alters suggests the presence of coping mechanisms put in place to prevent emotional distress [3]. It also supports the hypothesis that parts of the brain related to emotions and emotional regulation, such as the prefrontal cortex and limbic system, are activated differently depending on the alter's role and context [3].

Similarly, in Schlumpf et al.'s study, researchers backed up these findings as they revealed different neural activation patterns of alters as they reacted to external stimuli [5]. The emotional alter had increased activity in the prefrontal cortex, somatosensory cortex, and motor areas, while the normal alter had elevated perfusion in the thalamus [5]. The difference in brain activation suggests that alters are not just made by the subconscious mind but also have a distinct neurological backing for each one [5]. The increased activity in the temporal lobe of DID patients also indicates long-lasting anxiety that is often associated with their trauma [5].

Memory Gaps and Impairment

Peters et al. explored the struggles that many DID patients face when it comes to memory transfer between alters [4]. The study explained that while normal or control patients could easily complete memory tests, DID patients had trouble with the same tasks, specifically when the tested information was encoded by one alter and then asked of another [4]. This suggests that DID patients do not properly transfer memories between alters, supporting the notion that memory encoding and retrieval in DID patients is state-dependent and potentially affected by the smaller-than-average hippocampus and other brain structures [4].

These findings align with the idea that DID patients failed to activate the parietal lobe (the part of the brain that is needed for attention and working memory) during memory tasks [2]. Instead, DID brains relied on newly created, different neural pathways, leading to poor performance on memory-related tests and, therefore, proof of memory gaps [2]. This discovery further supports the idea that normal brains and DID brains have a number of differences, and the specific differences in DID brains have led to memory fragments [2].

Additionally, it has been found that memory fragmentation is a common symptom of DID, with participants reporting memory gaps when it comes to recalling traumatic events and life experiences [1]. These memory gaps are likely due to dysfunction in the hippocampus, as a lack of hippocampus size has been known to be a cause of an inability to form proper memories [1]. These findings, specifically the fact that over 90% of participants in this study reported amnesia, display the significance and the commonality of amnesia in DID patients [1].

Integration of Findings

All of these studies convey the idea that the dissociations experienced in DID are seen through both neural activity and psychological symptoms. The activation of different regions of the brain by different alters highlights the connection between trauma, multiple identities, and memory [4]. The studies suggest that the brain creates coping mechanisms that have led to the formation of alters, which have new specialized neural pathways that support the different alters at the cost of properly integrated memory.

Relevance

These findings are significant in both the world of medicine and neuroscience. By noting the neurological background of DID, these studies challenge the notion that DID is only a psychological disorder by proving that it has a number of neurological impacts. This knowledge can help advance treatment methods and overall increase the public understanding of DID. For

this reason, understanding the neural systems that back DID and its symptoms can aid in improving the lifestyle of DID patients.

Future Pathways

Despite the progress made by these studies, several gaps remain in the research. Due to the types of studies and the rarity of DID, the sample sizes for these experiments were small, resulting in generalizations, and conclusions to be made for all DID patients. Future research should involve a large volume of participants, allowing for diversity and therefore generalization. Long-term studies such as longitudinal studies are necessary to better understand how the neural and cognitive patterns explored above change, mature and evolve over time. These studies should specifically look at the impacts that therapy has on the symptoms of DID patients as well as the inner workings of their minds.

Conclusion

These studies all highlight the impact DID has on memory and neural function, with evidence supporting the notion that neural activity is specific to a patient's state and alter, therefore leading to impaired memory integration between alters. These findings display the need for continuous research and studies to further our understanding of DID, allowing us to come up with better, more targeted therapies for patients. By using both psychology and medicine, these studies will be able to improve the standard of living and overall lives of those living with DID and other trauma-related disorders.

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