

Neurological Differences between the Host and Alternate Identities of a Patient Diagnosed with Dissociative Identity Disorder

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What is Dissociative Identity Disorder?

The American Psychiatric Association characterizes dissociative identity disorder as “the presence of two or more distinct identities or personality states that recurrently take control of the individual’s behavior, accompanied by an inability to recall important personal information that is too extensive to be explained by ordinary forgetfulness” (Ringrose, 2012, p. 3). Rather than the emergence of numerous distinct personalities, dissociative identity disorder is characterized by identity fragmentation; thus, it is important to understand the structure of the personality of an individual diagnosed with DID (Ringrose, 2012).

The Structure of a DID Personality

The Host

Variation is common in cases of dissociative identity disorder, but oftentimes there is a core personality that is widely understood by others, as well as different personas that are concealed and emerge situationally (Sullivan, 2009). This core personality, or the facet of one’s self that is typically displayed to others, is known as the host. The host is the personality that is most often in executive control and can be seen as a shell, outwardly facing the world, while the alters assume their role as necessary (Howell, 2011). Initial contact in therapy is made by a host; and when there is only one host the client typically identifies with that personality as “me” (Ringrose, 2012). The host is the identity that spends most time fronting or engaging with the outside world.

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Alters

The various personalities of an individual diagnosed with dissociative identity disorder are known as alters. Each of these personality states have its own unique characteristics, behavior, and recollections (Sullivan, 2009). These altered personality states have profoundly separate experiences from each other regarding memories, distinctive affects, conduct, self-perception, physical perception, and thought patterns (Howell, 2011). Altered personalities may exhibit sexual orientations, ages, and genders that are not consistent with their core personality, and the host may not be aware of the existence and experiences of the alters (Sullivan, 2009).

Characteristics of Dissociative Identity Disorder

Symptoms

Common symptoms of dissociative identity disorder can be behavioral such as self-harm or suicide attempts. These symptoms are often seen as an attempt to stop switching, or the common reason, of attempting translate emotional pain to physical pain. Emotional symptoms include anxiety, depression, low self-esteem, mood swings, and numbness. Neurological symptoms include amnesia, auditory hallucinations, fugue episodes, insomnia, and lost time. Amnesia is commonly seen in patients with DID, as the traumatic events of their childhood are often repressed, and an amnesic barrier isolates the experiences and memories of each alternate identity. Auditory hallucinations are known to come from inside the head and represent the voices of alternate identities. When an individual experiences a fugue episode, they find themselves at a destination with no understanding of how or why they arrived there (Ringrose, 2012).

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Causes

Repeated childhood traumatization, particularly before the age of five, is seen as a central factor in the development of DID, as more than 95% of DID patients report a childhood history of abuse (Hart et al., 1996). The preoperational stage is the period in which a child's imagination flourishes, so it is reasoned that alters may be the internalized imaginary friends that were created as a "solution" to cope with severe trauma in early childhood (Gillig, 2009). The origin of a dissociative disorder in individuals with DID can be traced back to estrangement—when the individual faces an unbearably traumatic event, the individual dissociates and assumes the traumatic condition is not happening to oneself, but someone else. This coping mechanism results in the inability to undergo the processes of accommodation and assimilation, so the integration of the traumatic experience is unable to infiltrate into one's autobiography. In order to overcome and process the trauma, the individual evaluates themselves through diverse perspectives, which develop into alternate personalities following repeated utilization. After the emergence of alter personalities the host personality cannot process trauma; thus, the alter personalities are reinforced and become increasingly successful in coping with new and past trauma (Öztürk, 2016).

History of Dissociative Identity Disorder

The earliest, confident case of dissociative identity disorder can be traced back to the sixteenth century case of Jeanne Ferry. The report of Jeanne Ferry, the 25-year-old Dominican Nun, was originally published in 1586 by Dr. Désiré Bourneville who claimed Ferry was the most perfect case of "dédoublément de la personnalité" or multiple personality disorder.

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Ferry had several alter identities: Mary Magdalene, Namon, Béliat, Cornau, Sanguinaire, and Garga. The Mary Magdalene alter appeared in moments of crisis and was claimed to be highly rational and helpful in Ferry's treatment. Namon and Béliat are described as internal devils who are blamed for Ferry's acts of sacrilege but also function as protectors. Jeanne Ferry was said to have several demon alters: Cornau which is responsible for Ferry's disturbingly unhinged eating; Sanguinaire is responsible for her self-cutting, as he demands pieces of her flesh; and Garga protected Ferry from feeling the pain of beatings during her childhood, but reenacts them, by engaging in head and body-banging, and suicide attempts via cutting the throat and self-strangulation.

Alongside the presence of alternate personalities and amnesia, Jeanne Ferry suffered from somatic symptoms. Some of the symptoms Ferry suffered from include vomiting, pauses in breath, spasmodic limb movement, persistent body aches (in the head, heart, and stomach), sleeplessness, and speech loss. Some of these somatic symptoms were a result of her alternate identities inhabiting and disturbing certain body parts, resulting in a blind eye, vulgar language, or tender throat. Bourneville describes the case of Jeanne Ferry as the most perfect case of DID because it represents how it is a condition that affects physiological functioning and sensation as well as memory, consciousness, and identity shifts (Hart et al., 1996).

The Neurology of Dissociative Identity Disorder

Differentiation Between the Host & the Alters

In some cases, alters and hosts have observable differences like a difference in mannerisms, handedness, and/or physical skill levels. It has been observed that patients

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diagnosed with dissociative identity disorder have increased white matter in the right hemisphere of the brain, which may explain how alters can manifest through different circuits between cortical regions for movement (Blihar et al., 2020). The increased white matter observed in DID brains suggests that there are extra avenues in the cerebral cortex in which the alternate personalities utilize to see, hear, think, and experience sensation. Derealization of the host occurs when an alter takes control of the body, which can potentially be explained by the observation of smaller volumes of several structures in the temporal cortex (Blihar et al., 2020). The correlation of temporal cortex size and derealization may be influenced by studies on temporal lobe epilepsy; a condition characterized by derealization, depersonalization and experiential hallucinations (Heydrich et al., 2019).

In a hyper aroused, or undermodulated self-state, individuals with DID demonstrate increased limbic activity (e.g., amygdala) and decreased cortical emotion regulation-related activity in the ventromedial prefrontal cortex (vmPFC). The increased limbic activity is logical, as hyperarousal often results from traumatic experiences, thus activating the sympathetic nervous system. Further, the prefrontal cortex is associated with personality and decision making, so the decreased activity may be able to identify the point in which there was a switch from the host to an alternate personality. Comparatively, in a numb, or overmodulated self-state, individuals with DID exhibit decreased limbic activity and increased cortical emotion regulation-related activity (Lebois, 2022). The difference in activity between under- and overmodulated self-states may be indicative of a difference in neurological activity between a host and its alternate personalities.

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Neutral Identity State (NIS) vs. Trauma-Related Identity State (TIS)

Reinders et al. (2014) performed a study in which they used positron emission tomography (PET) data to observe if there were differences in regional cerebral blood flow (rCBF) in participants under Trauma-related Identity States (TIS) and Neutral Identity States (NIS). NIS and TIS are terms that are analogous to the apparently normal part of personality (ANP) and the emotional part of the personality (EP) as identified by the Theory of Structural Dissociation of the Personality. Respectively, the NIS is the host, while the TIS represents the alternative identities in a patient with DID. In response to personal trauma scripts, the host and alternate identities show opposite rCBF activation patterns. Under a TIS, DID patients showed autonomic hypo-arousal with increased activation of the cingulate cortex and frontal gyrus. In addition, in a TIS DID patients showed a significant increase in the activation of the sympathetic nervous system with an increased heart rate and blood pressure. These physiological observations reflect how trauma triggers the sympathetic nervous system's fight or flight response. When comparing a patient's NIS to their TIS, we see an activation of the posterior multimodal association areas including the bilateral intraparietal sulcus, occipital cortex, and the bilateral precuneus. It is suggested that the posterior association areas are thought to mediate the process of withdrawal from painful personal scripts, and the impediment to recognizing information's personal relevance. It is further suggested that these networks are involved in the top-down suppression of unwanted autobiographical memories.

In response to traumatic personal scripts, there is a consistent activation in the dorsal striatum when a DID patient is in a Trauma-Related State. The dorsal striatum is negatively correlated with trait dissociation during stress-induced analgesia, or numbness, and is said to be involved in the task of suppressing unrelated information. Thus, it is assumed that the dorsal

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striatum is involved in the dissociation that occurs when switching between identity states, as well as maintaining the stability of the dissociated state. It is known that the accumbens areas of the ventral striatum is involved in identity state switching, and the dorsal striatum is involved with an individuals' memory systems. Thus, it is hypothesized that there is a shift from hippocampal to striatal memory functioning under stress-related conditions, similar to how stress-impaired functioning of the hippocampal system coincides with higher activation of the dorsal striatum.

Ultimately, it is suggested that the posterior association areas, the dorsal striatum, and the parahippocampal gyri play a critical role in the suppression of trauma-related autobiographical memories for DID patients in a Neutral-Identity State. Further, in a Trauma-Identity State the dorsal striatum is suggested to play a crucial role in the regulation of memory access by regulating the presence of different identity states (Reinders, 2014).

Differences in Brain Waves

Scientists observed that the variability between identity states involves beta wave activity in the frontal and temporal lobes. A study using quantitative electro-encephalogram (QEEG) data demonstrated that average alpha wave coherence was lower for alter identities than for host identities (Şar, 2017). It's known that beta waves are active when individuals are awake, and alpha waves are present during the calm-wakefulness stage, so one may hypothesize that alter identities are in a comparatively lower state of consciousness compared to the host.

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Self-Awareness and Lack of Expression

When alternate identities take over the host, they tend to struggle with expression, interpretation, and derealization. The left angular gyrus is involved in fact retrieval, while the right angular gyrus is responsible for the integration of knowledge and location. The supramarginal gyrus is involved in perceptual discrimination regarding input from auditory and visual cortices. Scientists try to explain the difficulty with interpretation, derealization, and expression by pointing to the smaller angular gyrus and supramarginal gyrus sizes in the inferior parietal cortex to explain why alters struggle with expression and self-awareness (Blihar et al., 2020). Compared to the expressive host, dissociative identities are described as emotionally repressed, which may be associated with the increased activation of the parahippocampal gyrus—a structure related to cognitive-emotional and sensorimotor dissociation (Şar, 2017). Further, differences in neuroactivity were generally spread across the brain, as the alters showed more activity in the brainstem, face-sensitive regions, and motor-related areas compared to the control (Şar, 2017).

Conclusion

In closing, the research indicates that alongside physical and behavioral differences there are neurological differences between the host and alternate personalities of an individual with dissociative identity disorder. Brain waves, such as alpha and beta waves, size of the brain structures, and regional cerebral blood flow activity when analyzing PET scan data support this. When an individual experiences trauma, various differences may occur resulting in the utilization of these alternate identities.

References

- Blihar, D., Delgado, E., Buryak, M., Gonzalez, M., & Waechter, R. (2020). A systematic review of the neuroanatomy of dissociative identity disorder. *European Journal of Trauma & Dissociation*, 4(3), 100148.
- Gillig P. M. (2009). Dissociative identity disorder: a controversial diagnosis. *Psychiatry (Edgmont (Pa.: Township))*, 6(3), 24–29.
- Hart, O. v. d., Lierens, R., & Goodwin, J. (1996). Jeanne Fery: A Sixteenth-Century Case of Dissociative Identity Disorder. *The Journal of Psychohistory*, 24(1), 18.
<https://oneonta.idm.oclc.org/login?url=https://www.proquest.com/scholarly-journals/jeanne-fery-sixteenth-century-case-dissociative/docview/1305590616/se-2>
- Heydrich, L., Marillier, G., Evans, N., Seeck, M., & Blanke, O. (2019). Depersonalization-and derealization-like phenomena of epileptic origin. *Annals of clinical and translational neurology*, 6(9), 1739-1747.
- Howell, E. F. (2011). *Understanding and treating dissociative identity disorder: A relational approach* (Vol. 49). Routledge.
- Lebois, L. A. M., Ross, D. A., & Kaufman, M. L. (2022). "I Am Not I": The Neuroscience of Dissociative Identity Disorder. *Biological psychiatry*, 91(3), e11–e13.
<https://doi.org/10.1016/j.biopsych.2021.11.004>
- Öztürk, E., & Sar, V. (2016). Formation and functions of alter personalities in dissociative identity disorder: a theoretical and clinical elaboration. *J Psychol Clin Psychiatry*, 6(6), 00385.

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- Reinders, A. A., Willemsen, A. T., den Boer, J. A., Vos, H. P., Veltman, D. J., & Loewenstein, R. J. (2014). Opposite brain emotion-regulation patterns in identity states of dissociative identity disorder: a PET study and neurobiological model. *Psychiatry Research: Neuroimaging*, 223(3), 236-243.
- Ringrose, J. L. (2012). *Understanding and treating dissociative identity disorder (or multiple personality disorder)*. Karnac.
- Sullivan, L. E. (Ed.). (2009). *The SAGE glossary of the social and behavioral sciences*. Sage.
- Şar, V., Dorahy, M. J., & Krüger, C. (2017). Revisiting the etiological aspects of dissociative identity disorder: a biopsychosocial perspective. *Psychology research and behavior management*, 137-146.