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Did Dissociative Amnesia Evolve?

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Abstract

Dissociative amnesia is a diagnosis category that implies a proposed mechanism (often called dissociation) by which amnesia is caused by psychogenic means, such as trauma, and that amnesia is reversible later. Dissociative amnesia is listed in some of the most influential diagnostic manuals. Authors have noted the similarities in definition to repressed memories. Dissociative amnesia is a disputed category and phenomenon, and here I discuss the plausibility that this cognitive mechanism evolved. I discuss some general conditions by which cognitive functions will evolve, that is, the relatively continuous adaptive pressure by which a cognitive ability would clearly be adaptive if variation produced it. I discuss how adaptive gene mutations typically spread from one individual to the whole species. The article also discusses a few hypothetical scenarios and several types of trauma, to examine the likely adaptive benefits of blocking out memories of trauma, or not. I conclude that it is unlikely that dissociative amnesia evolved, and invite further development of these ideas and scenarios by others.

Keywords: Memory; Dissociative amnesia; Gene frequencies; Evolution; Adaptation; Trauma

1. Introduction

Evolutionary theory is the central underlying theory of the life sciences (Darwin, 1859; Wright, 1937; Dawkins, 1976), and encompasses the adaption of mental cognition in animals

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and humans (Pinker & Bloom, 1990; McLean, 2001; Tooby & Cosmides, 2015; Preuss & Wise, 2022). Evolutionary theory previously has been applied to memory (Klein, Cosmides, Tooby, & Chance, 2002), and to emphasize the adaptive nature of reconstructive memory (Otgaar & Smeets, 2010 Howe & Otgaar, 2013; Otgaar, & Howe, 2014). There has also been some work on how mental cognitive abilities evolve (e.g., van Horik & Emery, 2011; Shettleworth, 2009; Mitchell, 2016). What has not been discussed at length before in peer-reviewed articles is the plausibility that dissociative amnesia could have evolved. Repression and dissociation have occasionally been mentioned in the context of evolution, though these attempts appear questionable (Freyd, 1994; Nesse, 1990; Halvorsen, 2014). Some researchers have mentioned in passing that dissociative amnesia of a psychological trauma would decrease fitness (French, 2021; Pope, 1997; R. McNally personal correspondence, Nov 2022). For example, Pope (1997) wrote:

> Actually, from a Darwinian point of view, repression is anything but reasonable. If, for example, one did not vividly remember being attacked by a lion, but instead repressed the memory then one would be liable to wander in front of other lions in the future—with inauspicious consequences both for one's own survival and that of one's species. Surely it would seem more logical that Mother Nature would have designed us to remember traumatic events vividly, so that we could avoid a repetition of them in the future. (p. 9)

This article takes an initial imperfect step of expanding this argument further, with the hope that others will build and improve on this in the future.

2. Definition

Dissociative amnesia as a concept is different from organic amnesia, in that organic amnesia has detectable physical causes. If no physical causes are found in an amnesic case, some have then assumed that the forgetting is psychogenic. This psychogenic amnesia is now most often called dissociative amnesia. The psychogenic cause is generally believed to be a *psychological* shock or trauma that in turn causes a splitting or dissociation. In Otgaar et al. (2019), we showed how dissociative amnesia has a similar definition to the concept of repressed memories. In this article, I focus on the dissociative amnesia definition as it is laid out in the globally influential Diagnostic and Statistical Manual of Mental Disorders (DSM-5: APA, 2013). The diagnostic criteria for dissociative amnesia include "an inability to recall important autobiographical information, usually of a traumatic or stressful nature" and "is not attributable to the physiological effects of a substance…or a neurological or other medical condition" (APA, 2013; p. 298). In other words, *dissociative* amnesia is psychologically caused, not physically caused. Key to this dissociative amnesia definition is the storage of the traumatic memory, followed by "a period of time when there is an inability to recall" due to a psychological cause (trauma), and it is "potentially reversible" and recalled later (p. 298). The DSM-V is a supposedly scientific guidebook, so it is crucial that a phenomenon defined within it is real, and could have plausibly evolved.

3. Broad general argument

My central argument will be that blocking out traumatic events would almost certainly reduce fitness, and let us examine this in several examples. The discussion may become absurd at times, but that may actually be a central point of this article. Bear with me as I lay some foundations for this rational argument.

The first part of the argument is that dissociative amnesia was not present in our most distant ancestors, and therefore, if it is a true adaptation to trauma, it must have evolved. For a mental cognition adaptation to evolve—such as dissociative amnesia—the genes that led to that adaptation must lead to more offspring reaching sexual maturity consistently over generations. In the first generation, the beneficial genes will have a very low frequency in the species—perhaps even just one individual may acquire a mutation or a unique combination of genes via the variation created by sexual reproduction. If that individual has an advantage and their descendants marginally out-number others, these gene frequencies will gradually increase in the species. Eventually, the genes related to the tendency to dissociate with amnesia in response to severe trauma would then become part of the species' genome. During all of these thousands of years of evolution of something like dissociative amnesia, almost all generations with the dissociative amnesia genes would have to have slightly more offspring each generation that reach maturity. It has to be a very consistent advantage.

4. Anticipating objections

In writing this article, I am trying to anticipate objections and cover at least some of them. Possible objections include that the mechanism may not have evolved in human ancestors, but a precursor mechanism might have arisen in very early ancestors, or in social mammal ancestors. So, I try to be thorough and discuss each possibility in chronological order. Another possible objection I foresee is that dissociative amnesia might have evolved for some types of trauma, and not others, so I take care to discuss conspecific trauma and not, physical and sexual trauma. As a result of these differing scenarios, there will inevitably be some unavoidable repetition of similar arguments, but this is necessary to consider each example thoroughly.

5. Early animal ancestors

Whether some of our earliest animal ancestors had autobiographical memory at all is doubtful, so few may likely argue that dissociative amnesia evolved in our earliest nonmammal ancestors. Nevertheless, some may argue a precursor of dissociative amnesia evolved in ancient nonhuman ancestors. Let us contemplate the possibility that a rudimentary type of dissociative amnesia evolved in an early ancestor with a very rudimentary memory system. Imagine perhaps a fish or reptile ancestor. Would the blocking out of highly aversive experiences provide an advantage to such an animal? No: it is difficult to identify a conceivable advantage to not remembering any highly salient events. Those that remembered traumatic

events would likely better avoid threats and reproduce more. At the very least, dissociative amnesia for the most life-threatening or reproduction-threatening events would not give any sustained advantage such that the genes for such a cognitive ability would spread throughout a population and become part of the genome.

For example, let us say a juvenile in an early species witnesses its younger sibling being eaten by an adult male conspecific (of the same species). Let us say this juvenile just happens to have a mutation in the genes that allows it to block out trauma. Would these dissociative amnesia genes lead to increases reproductive success such that those genes spread throughout the entire population and became part of the genome? Not in this case: those juveniles that go on to remember and thus avoid the dangerous conspecific would survive longer.

6. Later animal ancestors

If we can accept that our very early animal ancestors did not evolve the dissociative amnesia adaptation to severe trauma, let us now consider our social-mammal ancestors. These ancestors may also have rudimentary forms of autobiographical memory. In our ancestors that are very social, such as rodents and primates, we might ask whether there would be any advantage to block out a trauma perpetrated by a conspecific in their social group. A trauma from a conspecific with an ongoing relationship, perhaps.

For example, let us say that a young tree-dwelling early primate is violently hit by a rogue older male, and the juvenile falls from the tree. It is shocking and traumatic for the juvenile. Would that young primate go on to have more offspring by blocking out the trauma? Not in this case: the advantage of remembering and avoiding the rogue male would be advantageous. In addition, the remembering has premium value in the short term, and less utility many years later. In this case, the memory is of most use while the rogue male is still dangerous, and while the juvenile is still smaller than the male. There is a diminishing utility in remembering old trauma years later because the circumstances may have changed (e.g., when the old male dies, there is less utility to remember). Therefore, the possibility that a mechanism like dissociative amnesia evolves in these social animal ancestors is minimal. More likely is that traumas coming from conspecifics in a social group induce strong remembering in the months afterward, and that will have an evolutionary benefit.

7. Human ancestors

7.1. Psychological trauma from physical violence

Did dissociative amnesia evolve then in early humans? Imagine an ancient ancestor, perhaps an early hominid 7-year-old child, observed a crocodile leap out of the water and grab their small sibling by the arm, and drag the sibling to her death. It was both shocking and traumatic for the observing child, and affecting. Is there any evolutionary benefit to block out the autobiographical memory of that, or to block out even the fact that the event

happened? No: if anything, there will be an advantage to remembering that the event happened, and an advantage to remembering the core details. The core details, for example, of how the crocodile moved, how far its reach is, are all important to remember, so as to know how to avoid the same fate.

Those ancestors who remember the danger in that specific area of the water from that specific threat would avoid such areas and that animal. Remembering details, such as the predator, would help avoidance behaviors of crocodiles in other contexts too—in other areas and times. One counterargument could be that dissociative amnesia might evolve to allow an ancestor to inhibit their fear (e.g., of crocodiles) in order to attain resources (e.g., to drink at a waterhole). Nevertheless, being able to inhibit fear while still remembering what could happen (e.g., the reach of the crocodile) would be the optimum resolution to this dilemma, not dissociative amnesia.

In humans, autobiographical memory is crucial for the communication of threats to others in the group. Would a subgroup of humans have an evolutionary advantage or disadvantage from being able to communicate the events of an extreme threat to others in the group, compare to those who instead develop dissociative amnesia? I argue that those that remember the events, like the crocodile traumatic event in autobiographical memory, will have a strong advantage—it would allow them to communicate the incident to genetically related kin (Hamilton, 1964). Therefore, those kin who carry many of the same genes will hear stories that would help their survival.

7.2. Psychological trauma from sexual violence

We have discussed examples whereby both conspecific and nonconspecific threats appear not to facilitate dissociative amnesia to evolve. Let us now examine an example that most matches the cases that—in the last 40 years (see also early work by Freud)—have purported to lead to dissociative amnesia—a trauma that is sexual in nature, and involves a family member and a betrayal of trust (cf. Freyd, 1994). Perhaps it is possible that only under these conditions—with very specific types of traumas—that dissociative amnesia occurs.

The scenario is on the grasslands of Africa, in a hunter−gatherer group, an early human 9-year-old girl is sexually assaulted and raped by her father. As difficult as this discussion is, let us think this through in terms of the likelihood of the evolution of dissociative amnesia in terms of gene frequencies. If this girl has dissociative amnesia genes, would she go on to produce a healthier line of descendants than those facing the same trauma without those genes? I argue that if this girl blocks out the trauma via dissociative amnesia that would be a disadvantage. For one, she cannot communicate to other potential protectors that she had been raped. Nor will she avoid the threat as effectively as someone who remembers, similar to the earlier examples in this article. This lack of avoidance could lead to more abuse and a reduction in functioning, as well as a chance of a premature pregnancy of inbred, and less viable, offspring with lower genetic variation. The variation produced by sexual reproduction with nonrelatives is generally beneficial to future offspring. There is a clear advantage not to forget, especially in the short-term during the years of vulnerability that follow. On the other hand, an individual without dissociative amnesia would be able to use autobiographical

memory and language to build social protections, avoid or navigate the threat, and reproduce with a nonrelative and have more genetically diverse offspring—and at a time that is more optimal for success. Here, again, there is no *consistent* advantage for the hypothetical dissociative amnesia genes to get a foothold and then spread through a population.

One good counterargument might be that remembering the attack by the father could be maladaptive as the father may still be important for survival and protection. So, the mind has a conflict between avoiding a monster, but still needing to be looked after by it. Therefore, a new mechanism might evolve to reduce the avoidance by blocking the memory. More likely, though, is that an adaption would evolve that uses previously evolved mental abilities, such as the ability to inhibit fear (of the caregiver) while still remembering the shocking event. The knowledge that someone is dangerous in a specific way would be valuable, not the least because it might be predictive of a multitude of harms from the depraved individual.

Most would likely agree that dissociative amnesia was not present in nonhuman ancestors. The human species brought two crucial additions: well-developed autobiographical memory and language capabilities. Both of these adaptations provide no foreseeable reason for dissociative amnesia to evolve in humans. Language provides a distinct additional advantage to remember traumas—so that they can be communicated in what is a highly social species. Autobiographical memory provides an ability to relay these episodes of trauma in a story-like form to other humans.

8. Proximate versus ultimate explanations

Some of the above argument has focused on the ultimate level of evolutionary explanation, in other words, the concern of fitness consequences of dissociative amnesia. Proximate explanations are concerned with the mechanisms that underpin the trait. Howe and Otgaar (2013) discussed the adaptive memory mechanisms that have been revealed by the quantitative study of memory, such as better remembering for survival-related events. This work on survival processing points to real identified mechanisms, and adds to the argument that trauma tends to be remembered better than nonsurvival-related events (see also Kroneisen, Erdfelder, & Buchner, 2013; Otgaar, Jelicic, & Smeets, 2015; Otgaar & Howe, 2014).

9. Summary

In sum, it is difficult to envisage dissociative amnesia evolving as a mental mechanism in early ancestors, social ancestors prior to humans, or in humans. Nevertheless, other scientists are invited to add scenarios for discussion, logical argument, and thought experiments, and together we can develop these ideas. Future work could discuss the early evolution of memory for salient events—including the shared excitatory amygdala-hippocampal-cortex memory mechanisms that evolved in our ancestors. Evolution builds on previous mental abilities and cannot produce adaptations out of whole cloth that oppose previous neural architecture. In addition, scientists might further discuss the consistent environmental pressure that is needed

for a mental ability to evolve and spread to all conspecifics. A highly specific counterintuitive mechanism, like dissociative amnesia, would not evolve in response to rare events unless those rare events are reproductively catastrophic without the adaption, but not catastrophic with the adaptation.

Dissociative amnesia is listed, and legitimized, in the very influential and purportedly scientific guidebooks for diagnosis: the DSM-5 (APA, 2013) and ICD-11 (International Classification of Diseases; World Health Organization, 2019), and yet is something that is unlikely to have evolved by natural or sexual selection in our ancestors. The concept appears instead to have *culturally* evolved (cf. Dawkins, 1999; Saad, 2020) as an illusory mechanism and disease category. The concept may be culturally bound (Pope, Poliakoff, Parker, Boynes, & Hudson, 2007).

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