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Volume 11  
Issue 3 *Symposium on Brain Injuries*

Article

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1962

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### Recommended Citation

Ewing H. Crawfis, *Amnesia after Brain Injury*, 11 *Clev.-Marshall L. Rev.* 535 (1962)

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## *Amnesia After Brain Injury*

*Ewing H. Crawfis\**

**I**N DISCUSSING AMNESIA, it is first important to point out that it occurs as but one of a number of symptoms of brain injury. While we choose to single it out, we should keep in mind that it exists contemporaneously with, and in relation to, other symptoms.

Symptoms of head injury fall into two groups: those of general disturbance of brain function and those of local cerebral damage. One result of brain trauma is a disturbance of consciousness. Amnesia occurs as a symptom in the process of recovery from such a disturbance, and as one of the symptoms of general cerebral disturbance along with stupor, confusion, etc. The disturbance of consciousness is usually related in degree to the severity of the injury and the amount of brain damage. In milder cases, with loss of consciousness, then later a complete recovery, a period of retrograde amnesia dating from a few minutes to an hour or more prior to the injury occurs, and it extends to return to complete consciousness. In more severe cases, amnesia persists along with other symptoms of permanent brain damage, whereas in mild cases the amnesia for a specific time interval may be the only persistent symptom.

If one refers to several of the commonly used reference texts, amnesia is not discussed in great detail, presumably on the assumption that the examining physician is familiar with it as one of many indicators of brain function.

For example, Guttmacher and Weihofer<sup>1</sup> make three references to amnesia. It is referred to as a symptom of hysteria or conversion states,<sup>2</sup> a symptom of certain dissociative reactions,<sup>3</sup> and as a symptom of organic brain injury.<sup>4</sup> It is stated that there are two types of amnesia, retrograde and anterograde. The length

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<sup>1</sup> Guttmacher & Weihofer, *Psychiatry and the Law* (1954).

<sup>2</sup> *Id.* at 32.

<sup>3</sup> *Id.* at 39.

<sup>4</sup> *Id.* at 156.

of time wiped out is roughly proportional to the severity of the injury, and thus has medicolegal significance. Psychological factors may also affect amnesia, and alcohol as a possible complicating factor is mentioned.

Davidson<sup>5</sup> postulates six possible explanations for amnesia as follows: 1) hysteria 2) psychosis 3) alcoholism 4) head injury 5) epileptic fugue and 6) the patient is lying.

Penfield<sup>6</sup> states that memory has different forms. Man has functionally separable neuronal mechanisms for 1) memory of current experiences 2) memory of words, and 3) memory of generalizations or concepts. To some degree there is localization of organization of the brain for different departments of memory. Of these, that for memory and recall of words is possibly best known.

Noyes<sup>7</sup> a favorite psychiatric text, states that amnesia may be produced either by organic or by psychogenic factors. In organic amnesia physiological disturbances of neurons through chemical alterations, trauma or degenerative changes interfere with associative processes. Organic memory loss is caused both by impairment of registration and retention, more especially of the latter. In psychogenic amnesia recall, for psychological reasons, is inhibited. The absence of memory is an active defense against experiences which have proved unbearably painful or anxiety-producing. A selective amnesia in which inconvenient events or topics are forgotten is probably psychogenic in origin. A sudden and complete recovery of memory is not rare in case of psychogenic amnesia but does not occur if the amnesia has been caused by organic factors. Noyes describes both anterograde and retrograde amnesia, in cases of trauma particularly, as well as other organic brain disease. It is pointed out that organic amnesia may be followed or widely overlapped by a psychogenic failure to recall, especially in head injury.

Gray<sup>8</sup> lists a number of causes of amnesia; injury, toxemia, narcotics, alcohol, starvation, heat stroke, pellagra, the psychoses, epilepsy, neuroses, hysteria, suggestion, hypnosis, and also discusses feigned amnesia. While it is not specifically stated, the

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<sup>5</sup> Davidson, *Forensic Psychiatry* 161 (1952).

<sup>6</sup> Penfield, *Control of the Mind* 13, in *Symposium*, Univ. of Calif., San Francisco Med. Center, (1961).

<sup>7</sup> Noyes & Kolb, *Modern Clinical Psychiatry* 125 (5th ed. 1958).

<sup>8</sup> 2 Gray, *Attorney's Textbook of Medicine* Ch. 96 (3rd ed. 1961).

clear implication of the discussion is that organic amnesia is readily determined, and that the problem of differential diagnosis is more difficult between feigned amnesia and hysterical amnesia. Collateral signs or symptoms of disease or injury are noted as being of great importance.

One might sum up material on amnesia in reference texts by stating that they imply a clearcut differentiation between organic and psychogenic amnesia, and that evaluation of the amnesia, if it is a symptom, will assist in establishing the differential diagnosis.

Organic amnesia, as a symptom of traumatic brain injury, is described as being non-selective, as personally significant, rather specific as to time intervals, roughly proportional to the brain damage, tending to be more complete than fragmentary.

In the past few years, this concept of a clearcut distinction between the two types of amnesia has been attacked, and should not be considered an absolute diagnostic criterion. One of the factors which cause us to question the concept is the type of amnesia which occurs as a result of electric shock treatment.

This is clearly a traumatically induced amnesia, yet a number of psychiatrists have noted that the amnesia tends to be highly selective in the material which cannot be recalled.

A recent article entitled "Amnesia as a Language Pattern"<sup>9</sup> makes a significant contribution to the subject of trauma and amnesia. I would recommend reading of the entire article. However, before making reference to this article, I believe it worthwhile to add one additional comment on amnesia.

The memory function has been divided into three parts. These are (1) reception—the ability to receive and register in the central nervous system various items of information about the environment through sensory perception; (2) retention—the ability to retain this information; (3) recall—or the ability to bring the stored information back in a useful and meaningful manner.

While it is clear that deficits in both reception and retention can and do occur in certain traumatic or organic and also certain disease states it is also clear that in ordinary discussion of the subject of amnesia we are referring to the inability to recall.

The report<sup>10</sup> mentioned above points out that we experience

<sup>9</sup> Weinstein, et al., *Arch. Gen. Psychiat.* (April, 1962).

<sup>10</sup> *Ibid.*

reality symbolically. The symbols take on form, not only by stimulation, but by reason of their place in patterns, which are organized in spatial-temporal, and social contexts. Words and actions do not stand for isolated things, but for whole relationships and categories, relating the person to the event, the situation in which reference is made, and to a socially derived conceptual system.

Language is the product of our interaction with the environment. We are largely unaware of memory, which is the process of sorting and arranging what is perceived and remembered as reality. In remembering, a new stimulus acts as a cue which enables us to select out of the past those responses most relevant to the need of the moment.

It is suggested that a feeling of reality is related to the symbolic patterning, and is in some degree an expression of identity. Such things as slang phrases, poetry, proverbs, colloquialisms, the argot of special groups, all are language mechanisms which afford a feeling of reality because of the sense of social relatedness.

This report<sup>11</sup> refers to a comprehensive study of two hundred patients with head trauma who were admitted to Walter Reed Hospital. A few of these pertinent observations will be summarized.

Amnesia was observed as part of the loss of relatedness in the environment. This was commonly seen in those patients whose injuries had produced varying degrees of retrograde amnesia, with additional loss of memory for events outside the period of retrograde amnesia. In minor injuries, the patient, while not actually remembering the accident, had recognition of being in the hospital, being bandaged, etc. There was a pattern of reality apparent, and a feeling of relatedness to the environment.

In cases of severe damage, there was a loss of relatedness which included current as well as past events. Examples of this were: the patient does not know the date nor where he is, with a calendar in full view, and in a hospital setting; such patients usually do not know the name of the doctor, nurse, etc.; they are vague about identifying details in their past. Some of these patients were able to express feelings of unreality. Frequently they expressed the feeling that the accident had not happened.

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<sup>11</sup> *Ibid.*

Amnesia may be an index of the patients' relatedness in the environment. As improvement in these patients occurred, it was noted that their amnesia improved, and became selective. Memory is related to the sources of identity, and the social relationships through which identity is maintained. In the return of memory, there are significant clues to personality problems. The "last" memory before injury may be significant as a symbolic representation of the stress of the present. "Last" memories were observed to shift, and parallel the improvement of the patient. Memories did not return in chronological sequence, nor in shrinkage of the temporal span of memory loss.

In addition to amnesia, there are associated and alternate symbolic patterns which occur with organic brain damage. The report discusses these. These patterns appear in patients with little or no amnesia being directly expressed. They are confabulation, denial, disorientation, reduplication, and the use of the third person.

Confabulation is the narration of a false version of an event. While referring to the past, it is also a representation of the present, in metaphor, so to speak. It is pointed out that confabulation carries feelings with it, in that patient expresses the false version as being felt as a real one.

The use of the third person is a type of confabulation, but here the patient attributes the incident to a third person.

Reduplication may occur in any one of the three spheres of time, place, and person. Examples are: two or more places of the same name, the present event also occurred in the past.

Transient experiences of "deja vue" (already seen) phenomena is a similar symptom. It is pointed out that the extra experience in each instance differs in some significant detail.

It is interesting that they report that these patterns are maintained even during amytal interviews.

As a result of this study, it is believed that organic amnesia should not be thought of as a unitary memory defect, but a language form. While the reference is to a past event, it is a product of the past, present, and future aspects of the environment. As such, it varies in relation to the individual, and to the organization and social context of his adjustment.

### Summary

Amnesia is an important symptom of brain injury. In mild cases it may be the only residual symptom, in more severe cases it is only one of many symptoms. Its value in differential diagnosis is debatable, and the differences between organic and psychogenic amnesia are not as clearcut as was formerly thought.

A study of amnesia, in cases where the cause was clearly due to brain injury, indicated that a careful evaluation of the pattern of amnesia is important to the psychiatrist in understanding the changes occurring in the individual patient. Equivalent symptom patterns, which may be associated with amnesia or alternate to it, may also be helpful.

Finally, amnesia should not be thought of as the inability to recall any single isolated fact, but in relation to entire patterns of behavior. In these patterns, while there is reference to a past event, current relationships of the patient to his environment are as important as past ones, and anticipated future relationships may also influence them.

We conclude then, that while amnesia may not be as significant as was thought in differential diagnosis of brain injury, if properly evaluated, it is of value in understanding the individual patient, and thus may be very helpful in prognosis and treatment.