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Memory and learning in clinical practice

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Given a goodly dash of genetically coded information, memory and learning comprise the essential processes of human experience. When they are impaired, powerful effects pervade all aspects of cognitive and linguistic functioning and adaptive behaviour.

The capacity to learn information and acquire skills, and retain them adequately in memory, can be shattered in an instant by traumatic brain injury[1] or stroke[2], gradually whittled away by neurodegenerative diseases and disorders[3], subtly altered by nutritional deficiencies in infancy[4], insidiously damaged as a consequence of exposure to toxins[5], torture and trauma, and seriously messed with, along with the rest of your head, if you engage in substance abuse[6] or take certain prescription drugs.

Normal processes

Memory is the ability to acquire and retain skills and knowledge, while learning is a relatively permanent or enduring change in behaviour that results from experience. An appreciation of the normal processes of learning, and memory coding, storage and retrieval[7] (Craik & Lockhart, 1972; Thompson & Krupa, 1994) enhances our insight, as clinicians, into the effects for the individual client and their families of impaired memory[8] function.

E-book

Now available as an e-book with a free sample chapter on The Brain[9], Gazzaniga & Heatherton (2004) provide a lucid account, for an undergraduate readership, of the normal processes of memory[10] and learning[11]. They begin with the classic modal memory model (Atkinson & Shiffrin, 1968), in which our sensory memory stores, fleetingly, the information that we perceive through our senses and transfers it to short-term[12], or "working" memory (Baddeley, 1992). All being well, the working memory can hold, very briefly, up to seven chunks of information in a three-part arrangement comprising central executive, visuospatial scratchpad, and phonological loop. Here, meaningful information is processed for transfer into the relatively permanent, and apparently limitless, long-term memory.

One of a kind

The Center for the Neurobiology of Learning and Memory[13] at the University of California is the world's only research institute dedicated exclusively to the multidisciplinary investigation of the basic brain mechanisms responsible for learning and memory. There they grapple with riveting and important questions about brain mechanisms (How does it create and preserve memories? What chemical keys does the brain use to lock experiences into memories?) and memory characteristics (Why are some memories vivid while others are vague? What can be done at the molecular level to strengthen or diminish memories?).

Alcohol, drugs and memory

Alcohol has a dramatic impact[14] on memory, interfering with the ability to form new memories, and causing partial and complete blackouts when consumed rapidly and in large quantities. Aaron White at Duke University is the author of Topics in Alcohol Research,[15] where he explains that blackouts are periods of memory loss for events that happened while a person was drinking. His section on alcohol and the adolescent brain and its long term, irreversible effects on neural development and cognitive functioning is particularly distressing. The combination of heavy or binge drinking and cannabis[16] use can lead to a tragic, and often lethal, combination of anxiety, depression, social isolation and disordered thinking.

Warning

In our drug taking society, there must be few adults whose lives have not been affected, directly or by association, by the loss of a young person who has fallen prey to substance abuse[17]. The simple truth is that as clinicians, often working at close quarters with vulnerable youth, we need to be knowledgeable about giveaway signs[18], and do something before it is too late.

References

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Links

1. http://www.brain-train.com/articles/substanc.htm
2. http://www.memorylossonline.com/glossary/stroke.html
3. http://www.uphs.upenn.edu/ADC/
4. http://www.unu.edu/unupress/food2/UID04E/uid04e00.htm
5. http://www.portfolio.mvm.ed.ac.uk/studentwebs/session2/group29/merctox.htm
6. http://www.couns.msu.edu/subabuse.htm
7. http://www.psybox.com/web_dictionary/LevelsofProcessing.htm
8. http://www.nlm.nih.gov/medlineplus/memory.html
9. http://www.wwnorton.com/college/titles/psych/ebook/sample/ch04.pdf
10. http://www.wwnorton.com/psychsci/ch7_overview.htm
11. http://www.wwnorton.com/psychsci/ch6_overview.htm
12. http://www.uark.edu/misc/lampinen/LEC3.html
13. http://www.memory.uci.edu/
14. http://www.duke.edu/~amwhite/Blackouts/blackouts2.html
15. http://www.duke.edu/~amwhite/index.html
16. http://www.betterhealth.vic.gov.au/bhcv2/bhcarticles.nsf/pages/Cannabis_and_psychosis
17. http://www.healthatoz.com/healthatoz/Atoz/dc/caz/suba/tnsa/tnsa_gen_symp.jsp
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