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Basic Memory Phenomena, Explicit and Implicit Memory

Summary:
I. Memory Aspect of "Mind Before Brain" (Autobiographical Memory Stored in the Mind)
II. Multiple Parallel Memory Systems
III. Explicit Memory vs Implicit Memory

For seminar presentation: Start lecture with the first step of the "priming" memory system demonstration: Present slide with 10 words, including "octopus" and "assassin." Ask audience to simply look at them for 1 minute. Specifically request that they *not* write them down – just look at them.

I. Memory Aspect of "Mind And Brain" (Autobiographical memory stored in the *mind*): As is carefully discussed in "Mind *and* Brain,"[1] I believe that the mind is a psychological phenomena that uses the biological brain as a servant, but that is ultimately above, outside of, and more primary than the neurophysiological phenomena in the biological brain. When studying memory phenomena, one of the foundational questions is whether some component of memory phenomena is carried in and/or handled by the mind, or whether all memory phenomena are mechanical processes of the biological brain.

My current assessment is that the memory phenomena discussed below are incompatible with any current brain-biology theory. There is no way I can think of that our biological brains – the storage of information in synaptic modifications in the neural network – can account for these phenomena. On the other hand, I think this data is consistent with the *core/most fundamental memory engram* being carried in the *non-biological mind*. My perception is that mainstream memory research focuses on the biological brain.

Memory phenomena/data indicating that the core autobiographical memory engram is stored ultimately in the non-biological mind:

A. "Impossibly" early autobiographical memories: If brain biology was the ruling consideration, a person could not store any autobiographical, narrative memories until the hippocampus is sufficiently myelinated – by18 months to two years at the very earliest, and usually not until three or four years of age. However, in certain unusual situations, people seem to have narrative autobiographical memories of experiences that occurred as early as infancy, and even prior to birth. Some of the most exceptional cases describe narrative autobiographical memories from early pregnancy (even to the time of conception) – *before the brain has even begun to form*. These most dramatic case studies, where the person has memories from before the biological brain has even begun to form – are some of the most dramatic data points indicating that the most fundamental memory engram must be carried somewhere other than

[1] Karl Lehman, Mind and Brain: Separate but Integrated (Evanston IL: Immanuel Publishing, 2024), pages 69-86.

the biological brain.[2] Note: It is not clear whether these memories have the same subjective quality as explicit autobiographical memories, or whether they are something else – a mind/spirit phenomena qualitatively different than explicit memory.[3]

B. Memories from an "out of body" perspective: In out of body experiences, the mind is observing and recording memory material (*accuracy of content corroborated by others*), from a perspective that would be impossible for the biological brain to obtain. For example, events that occurred in another room, or even another building, during the out of body experience.[4]

C. Memories of events while clinically dead: In the carefully studied and documented phenomena of near death experiences, the mind is present, and laying down clear, detailed long term memory material (*accuracy of content corroborated by others*), during times when the subjects were clinically dead and the biological brain disabled/inactive/off line.[5]

C. "Impossible" detail and accuracy of Life reviews: The "life reviews" often experienced during near death experiences seem to be similar to the incredibly vivid and detailed recall observed in Dr. Penfield's surgical stimulation cases and in Dr. Sachs' temporal lobe seizure cases. For example, Dr. Ritchie describes a vivid and detailed life review, and comments "...this total recalling, [was] detailed and perfect,...I couldn't have remembered a tenth of what was there until He showed it to me."[6] (Interesting question regarding near-death-experience life reviews: Is this information coming from God? Or the human person's mind engram? If you have had an NDE life review, please email me at drkarl@kclehman.com and let me know whether your life review was from the first-person perspective of being inside yourself, or from God's outside-observer perspective.)

D. Pre-death episodes of normal memory and cognition in severely demented patients: I have read a number of case studies/anecdotal accounts of patients with severe dementia who displayed sudden return of normal memory and lucid cognition for moments/minutes immediately before death.[7]

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[2] For examples of "pre-*brain*" memories, see Hallett, Elisabeth, *Stories of the Unborn Soul*. (Writers Club Press: New York, N.Y.) 2002; and Emerson, William; Linn, Dennis; Linn, Matthew, *Remembering Our Home: Healing Hurts and Receiving Gifts from Conception to Birth*. (Paulist Press: Mahwah, N.J.), 1999. See also description of intrauterine memory from a case study with one of my own patients, Karl Lehman, *Mind and Brain: Separate but Integrated*, (Evanston, IL: Immanuel Publishing, 2024), pages 78&79.

[3] We would like to collect careful descriptions of cases with early autobiographical memory in order to clarify the details of this phenomena. If you have had this kind of experience, or know of others who have, please contact me at drkarl@kclehman.com.

[4] See *Mind and Brain: Separate but Integrated* for more details and source references.

[5] See *Mind and Brain: Separate but Integrated* for more details and source references.

[6] Ritchie, George G., with Sherrill, Elizabeth. *Return from Tomorrow*. (Chosen Books: Carmel, N.Y.) 1978, pages 50-52.

[7] I encountered these accounts somewhere in the last 30,000 pages of material I have read, but can't remember where. If anybody has had similar experiences, or knows references for these accounts, please contact me at drkarl@kclehman.com.

E. Memory prodigies:

1. "Blind Tom," a musical prodigy: "Blind Tom" displayed astonishing musical abilities in spite of being nearly blind, mentally retarded with respect to most cognitive functions, and without musical training other than listening to others perform. At 11 years of age, he demonstrated the ability to perform 33 pages of complicated original[8] music, without error or apparent effort, after hearing it played once.[9]

2. Sherashevsky -- a memory prodigy: The famous Russian psychologist, A.R. Luria, studied one memory prodigy over the course of almost 30 years. This subject had "photographic" recall of numerical tables – he could "see" remembered numerical tables in his mind with such clarity that he could "read" the numbers in any direction/combination, even 10-15 years later, and in spite of thousands of similar exercises during the intervening time.[10] After almost 30 years of careful, systematic study of Sherashevsky's memory, Luria comments: "It was impossible to establish a point of limit to the capacity or the duration of his memory,..." (Page 61), and "Experiments indicated that he had no difficulty reproducing any lengthy series of words whatever, even though these had originally been presented to him a week, a month, a year, or even many years earlier." (Pages 11&12) These results – 100% accurate recall *years* later for thousands of similar memory tasks, for unimportant information, that was not rehearsed or used after initial encoding – do not fit purely neurological theory for cortical consolidation and "permanent" recall.

3. The twins – memory prodigies: The neurologist Oliver Sacks describes twin brothers, who have baseline IQs of 63, but also extraordinary memory abilities. John and Michael can describe the general public events they would have heard about, the weather, and the tiniest visual details of their own personal experience for any day of their lives. They also appear to posses an unlimited digit span.[11] "And if you ask them how they can hold so much in their minds – a three-hundred-figure digit, or the trillion events of four decades – they say, very simply, 'We see it.' And 'seeing' – 'visualizing' – of extraordinary intensity, limitless range, and perfect fidelity, seems to be the key to this."[12] Again, these carefully observed, thoroughly documented details do not fit usual brain-biology theory for memory.

4. Robert Evans – a memory prodigy: Robert Evans, an amateur astronomer in Australia,

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[8] A team of professional musicians, skeptical that his public demonstrations were somehow contrived, wrote two pieces of original music – 13 and 20 pages in length – for the explicit purpose of "testing" Tom's purported ability to perform a composition after simply hearing it performed once.

[9] Treffert, Darold A. *Extraordinary People: Understanding the Savant Syndrome.* (New York: Ballantine Books), 1989, pages 37-41; and Seguin, Edouard. *Idiocy and Its Treatment by the Physiological Method.* 1866. Reprint, (New York: Kelly) 1971 as cited in Sacks, Oliver. *An Anthropologist on Mars*. (New York: Vintage Books) 1995, pg 189.

[10] Luria, A.R. *The Mind of a Mnemonist*. (Cambridge: Harvard University Press) 1968, see especially pages 11&12, 15-20, 33, 60&61.

[11] "Digit span," a term used in memory testing, refers to the number of digits one can hear, remember, and then repeat. Most people can only remember and repeat 7-9 digits.

[12] Sacks, Oliver. *The Man Who Mistook His Wife for a Hat*. (New York: HarperCollins) 1970, pages 195-213.

demonstrates phenomenal, "photographic" memory: "Evans single-handedly, with a small telescope, observed the incidence of supernovae in a sample of 1017 bright galaxies which he observed for a period of five years.... Evans used no photographic or electronic assistance, and thus seemed able to construct and hold in his mind an absolutely precise and stable image or map of more than a thousand galaxies..."[13]

F. Amytal interviews: Darold A. Treffert, M.D., a psychiatrist who has studied memory prodigies extensively, comments about a similar extraordinary memory phenomena that he often saw in the context of amytal interviews used to help access repressed and/or dissociated memories: "In those interviews, patients recalled in extraordinarily minute detail, a whole variety of experiences they thought they had forgotten. In some instances a whole journey down a particular street on a particular night would be recalled with exquisite attention to particulars – changing stop and go lights, street signs and passing autos. Both the patients and I were often startled at the voluminous amount of material stored but out of access in the patient's waking state,....The memories were there. What was missing was access and recall."[14]

G. Temporal lobe phenomena (direct stimulation, seizures, and L-dopa stimulation):

1. Direct temporal lobe stimulation: With direct stimulation of the temporal lobe, Dr. Penfield (and now others as well) have elicited recall of memory events that could be described in detail as if the person was reliving the event during the stimulation. Many of these events, even events that don't seem to be associated with significant trauma, are described in INCREDIBLE detail. The patients report that the detail they *re-experience* (see, hear, etc) during stimulation is much more than they can normally recall regarding the events in question (often reported to be specific events that the person also has "normal" memory for). Patients report that they cannot retain the same level of details, even moments after the stimulation is stopped.[15] The experience these patients describe is just like when you look at a person standing in front of you, and then looking away. Even seconds after looking away, you will have trouble describing every detail. However, if you then look back at the person, *while you are looking at them* you can "see" every detail, and thereby easily answer any question regarding their appearnace – "what color is the cap of the pen sticking out of their pocket? Can you draw the exact shape of the lenses of their glasses:? How many times do their shoe laces cross?

2. Temporal lobe seizures: Dr. Oliver Sacks describes an 88 year old woman who began remembering vivid details from her early childhood following a temporal lobe stroke and the onset of associated temporal lobe seizures. During the temporal lobe seizures, she did not just remember details from the first five years of her life, but *re-experienced* them in vivid, extra-ordinarily detailed memory hallucinations (flashbacks) very similar to the phenomena described by Penfield in his work with direct temporal stimulation: "...I feel I'm a child in

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[13] Sacks, Oliver. *An Anthropologist on Mars*. (New York: Vintage Books) 1995, page 198.

[14] Treffert, Darold A. *Extraordinary People: Understanding "Idiot Savants."* (New York, NY: Harper and Row), 1989, pg xxi (prologue)

[15] Penfield, Wilder. "The Permanent Record of the Stream of Consciousness." *Proceedings of the Fourteenth International Congress of Psychology, Montreal, June 1954*. (Amsterdam: North-Holland Publishing Company), Wednesday, June 9, pages 47-69, and Penfield & Perot. "The brain's record of auditory and visual experience" *Brain*, (1963) Vol 86, Part 4 pp 596-696.

Ireland again – I feel my mother's arms, I see her, I hear her voice singing." As with Penfield's subjects, this unusual, flashback recall was dramatically more vivid and detailed than her "normal" memory recall experience.[16]

3. L-Dopa stimulation: Dr. Sacks' case study of a 63 year-old woman on L-Dopa indicates that, somewhere, her mind carried detailed and vivid memories that her usual retrieval processes were unable to access. Somehow, stimulation with L-Dopa resulted in the same kind of unusual memory content retrieval that is reported with direct stimulation of the temporal lobe:

> "This period was marked by...uncontrollable upsurge of remote...memories and allusions. The patient requested a tape-recorder, and in the course of a few days recorded innumerable...songs,...jokes and limericks, all derived from party-gossip,...comics, nightclubs, and music-halls of the middle and late 1920's....Nobody was more astonished than the patient herself: 'It's amazing,' she said. 'I can't understand it. I haven't heard or thought of those things for more than 40 years. I never knew I still knew them. But now they keep running through my mind.' Increasing excitement necessitated a reduction of the dosage of L-Dopa, and with this the patient, although remaining quite articulate, instantly 'forgot' all these early memories and was never able to recall a single line of the songs she had recorded."[17]

4. Thought regarding temporal lobe phenomena: As discussed in *Mind and Brain,*[18] Dr. Penfield hypothesized that the diencephalon is the point of connection between the mind and brain. There are neurological pathways directly from the temporal lobe to the diencephalon. Does temporal lobe stimulation thereby bypass all the usual (fallible, impaired) memory retrieval processes, and access the mind engrams more directly through diencephalon stimulation/connection?

Memory prodigies, amytal interviews, and temporal lobe phenomena demonstrate that it is possible for the human brain/mind to store most (all?) of our experiences in this incredibly detailed, vivid, accurate way. My hypothesis is that our non-biological minds routinely store our life experiences with this level of capacity and accuracy, but that there is usually a problem with the retrieval system.

NOTE: My perception is that those who are developing *brain-biology-based* memory theory, like Dr. Schacter (Harvard professor, prominent researcher, widely published author regarding memory), resist this data because it does not fit with their theories. Consider, for example, Schacter's misrepresentation of Penfield's data. (In one of his books discussing memory phenomena, Schacter states that Penfield's brain research did *not* find photographic-detail memory traces for relatively mundane experiences that could be retrieved by stimulating specific locations in the brain. However, when I read through Penfield's original publications, this is exactly what he *does* describe. Unfortunately, at the time of writing this essay, I cannot remember

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[16] Oliver Sacks, *The Man Who Mistook His Wife for a Hat*, (New York: Harper Collins) 1970, pages 132-149.

[17] Oliver Sacks, *The Man Who Mistook His Wife for a Hat*, (New York: Harper Collins) 1970, page 151.

[18] Karl Lehman, *Mind and Brain: Separate but Integrated* (Evanston, IL: Immanuel Publishing, 2024) pages 71 & 72.

the exact location of the corresponding material in Schacter and Penfield sources. If I ever stumble of these reference details I will include them here.)

Practical implications:

It is always good to have accurate models/theory. As we work with accurate models, they will lead us to practical insights and tools that produce good fruit. If we work with erroneous models, they will lead us astray.

It is important to be aware of the possibility that mind phenomena can sometimes over-ride the usual limitations imposed by the biological brain. If the facilitator is not aware of this, she will refuse to acknowledge/see/accept some true phenomena. Any time we dismiss true phenomena, we open ourselves to a variety of misunderstandings and errors. Early pregnancy memories of any kind, and precocious autobiographical memories from birth or early childhood would be important examples of "true phenomena" that might be dismissed if we approach emotional healing ministry from a brain-first perspective.

To some extent, the answer to "what are the practical implications?" is "we don't know that yet."

II. Multiple Parallel Memory Systems: A memory phenomena that it is very important to be aware of is that there are a number of parallel memory systems in the mind & brain. These different memory systems are *qualitatively* different, and can operate independently. The more carefully we study the mind and brain, the more complexity we discover with respect to different memory systems.[19]

Note: my primary purpose in presenting the following detailed examples is to transfer the deep, gut level understanding that there are truly multiple, parallel, qualitatively different memory systems in the mind and brain. I want you to *know, with personal conviction*, that there are different memory systems in the mind and brain.

A. Specific neurological injuries having distinctive effects on different kinds of memory: Some of the most easily understood data proving the existence of these parallel memory systems are observations from medical situations where a particular neurological injury affects the different memory systems in different ways:

1. Individual neurological case studies:

a. Dr. Sacks' patient, Greg: Dr. Sacks describes a carefully documented case study of a young man with complete loss of ability to lay down new autobiographical memory due to a brain tumor that destroyed the hippocampus on both sides of his brain. He would completely forget any personal experience within minutes – if you spoke with him for an *hour*, and then left briefly to use the restroom, when you returned *five minutes* later, he would have no conscious memory of ever having met you before. However, he could learn new pieces of information (factual/semantic memory), he could learn to find his way

[19] "Contemporary memory research has demonstrated the existence of a great complexity of memory systems within each individual. Most of these memory functions take place outside of conscious awareness, and each seems to operate with a relative degree of independence from the others." Van der Kolk, Bessel A, McFarlane, Alexander C, Weisaeth, Lars, Editors. *Traumatic Stress: The Effects of Overwhelming Experience on Mind, Body, and Society.* (New York: Guilford Press) 1996, pg 280.

around the hospital (behavioral memories), he could learn to type or play the guitar (procedural/performance memory), he could learn new songs – both the words and the music (musical memory), and he could form new emotional associations (emotional memory).[20]

The most dramatic demonstration of the difference between his severely damaged conscious autobiographical memory and his "other" memory functions was his experience with attending a Grateful Dead concert. Dr. Sacks took him to a Grateful Dead concert – a band he loved, but had not heard for many years. It was an all day event, and one that he participated in enthusiastically and passionately. The next day, he had no memory of going to the concert. But he could remember and sing the songs from the concert, and had positive emotional associations ("And now, whenever I arrive, and he hears my voice, he lights up, and greets me as a fellow Deadhead"[21]).

b. Amnesic patient who wouldn't shake hands: A famous demonstration by Dr. Edouard Claparede provides an example of a person with brain injury amnesia for new autobiographical experience who was still able to learn new emotional associations (such as being afraid of someone who had hurt her), and who was still able to learn new experiential beliefs (such as believing that Dr. Claparede had a pin hidden in his hand). While shaking hands with the patient, Dr. Claparede stuck her with a pin hidden in his hand. Even though she clearly had no conscious autobiographical memory of the event, even minutes after it had occurred, she refused, thereafter, to shake his hand.[22]

c. Amnestic seamstress: Robert Dunn, a British physician, describes a fascinating case that dramatically demonstrates separate neurological systems for autobiographical memory and procedural/performance/skill memory. Dr. Dunn's patient demonstrated profound loss of ability to remember any new autobiographical information after a near drowning incident, but was able to learn how to make dresses. She became an expert seamstress, but did not have any conscious autobiographical memory of working on any of the dresses she made.[23]

2. Brain injury amnesia and priming: People with brain injury causing profound impairment (or even complete loss) of ability to consciously remember new autobiographical experience can learn extensive material through a process called priming.

Second step of priming demonstration: Start with partial word prompts e_p_ _d_d (expanded) and _e_d_l_m (pendulum), and observe slow, difficult response (tell people to think of the answer and raise their hands when they get it, but not speak it out loud). Then show partial word prompts o_t_ _u_s (octopus) and a_ _a_ _in (assassin) with the same instructions, and observe quick, easy response. ****present the next paragraph before saying anything more about priming****

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[20] Sacks, Oliver. *An Anthropologist on Mars*. (New York: Vintage Books) 1995, pp 42-76.

[21] Sacks, Oliver. *An Anthropologist on Mars*. (New York: Vintage Books) 1995, pg 76.

[22] Claparede, Edouard. "Recognition and 'me-ness.' In D. Rapaport (Ed.), *Organization and pathology of thought* (New York, NY: Columbia University Press), 1951, pages 58-75 (Reprinted from Archives de Psychologie, 1911, Vol. 11, pages 79-90).

[23] Dunn, R. "Case of suspension of the mental faculties." *Lancet*, 1845. Vol 2, pages 588-590.

Careful research shows that, if we had waited a month to show you o_t_ _u_s, you would respond quickly and easily with octopus, but usually with little insight regarding the priming memory process. If we asked how you came to the answer so quickly, you would respond with something like "it's just an easy word" **(how many of you *feel* like octopus and assassin are just easier words than expanded and pendulum?)** When amnesic patients participate in priming studies, they behave as if they are guessing, and report *feeling* like they are guessing or "just thinking of the answer," but careful research shows that they "guess" the material presented earlier in the priming training session.[24]

In a dramatic demonstration of the power of this intriguing memory system, Glisky and Schacter used priming to provide job training for a patient who had lost her ability to remember new autobiographical events due to viral encephalitis. Amazingly, even though she had no memory of the training process, this training enabled her to work as a full time data processing technician, with speed and accuracy that were actually better than the average for her "normal" colleagues.[25]

3. Other similar cases: Many similar cases – cases where autobiographical memory has been lost due to focal neurological damage, but other memory systems are intact – have been carefully documented.[26]

4. Huntington's vs Alzheimer's: Huntington's disease and Alzheimer's disease cause damage in different parts of the brain. A team of researchers demonstrated that patients with Huntington's disease retain the ability to learn through priming memory, but have great difficultly learning new motor skills. Alzheimer's patients, on the other hand, retain the ability to learn new motor skills but show impaired priming. These results demonstrate that priming and procedural/performance/motor skill learning depend on different neurological storage and/or recall systems.[27]

5. Neil – loss of spoken recall but retention of written recall: Dr. Vargha-Khadem and colleagues present the fascinating case study of Neil, a 14 year-old boy who suffered marked cognitive losses after treatment for a brain tumor. He could still understand spoken language, and could also speak normally, but appeared to have great difficulty in remembering day to day autobiographical events. Then the psychologists who tested his memory noted that he

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[24] Warrington, Eliazbeth K., & Weiskrantz, L. "New Method of testing long-term retention with special reference to amnesic patients." *Nature*, 1968. Vol. 217, pages 972-974.

[25] Glisky, E.L. & Schacter, Daniel L. "Acquisition of domain-specific knowledge in organic amnesia: Training for computer-related work. *Neuropsychologia*. 1987. Vol 25. Pages 893-906; Glisky, E.L. & Schacter, Daniel L. "Extending the limits of complex learning in organic amnesia: Computer training in a vocational domain. *Neuropsychologia*. 1989. Vol 27. Pages 107-120; as cited in Schacter, Daniel L. *Searching for Memory*. (New York: Basic Books) 1996, pages 176-179.

[26] See, for example, Sacks, Oliver. *An Anthropologist on Mars*. (New York: Vintage Books) 1995, pages 42-76, Sacks, Oliver. *The Man Who Mistook His Wife for a Hat*. (New York: HarperCollins) 1970, pages 23-42, and Schacter, Daniel L. "Implicit Memory: History and Current Status." *Journal of Experimental Psychology: Learning, Memory, and Cognition.* 1987, Vol. 13, pages 501-518.

[27] Butters, N., Heindel, W.C., & Salmon, D.P. "Dissociation of implicit memory in dementia: Neurological implications. *Bulletin of the Psychonomic Society*, 1990. Vol 28, pages 359-366, as cited in Schacter, Daniel L. *Searching for Memory*. (New York: Basic Books) 1996, page 187.

was continuing to do well in school, and wondered how this could be. To their amazement, they discovered that although Neil appeared to remember nothing when asked to respond orally, he could accurately recall his school work, *and recent autobiographical events*, when asked to respond in writing. Furthermore, in spoken discussion about his memory he often expressed amazement at the content of his (accurate) written recall. This case study demonstrates that there must be neurological differences between the memory processes that moderate spoken recall and the memory processes that moderate written recall.[28]

6. Normal aging, with loss of frontal strategic search, but preservation of hippocampal associative recall: "Normal" aging affects the frontal lobes, but has minimal affects on the hippocampus and medial temporal lobes. Strategic recall – the voluntary, systematic searching for something you are trying to remember intentionally, requires the frontal cortex, the hippocampus, and the medial temporal lobes, whereas associative recall – the "automatic," involuntary recall of information when one encounters cues that are associated with the memory content in some way, does *not* require the frontal lobes. Therefore, associative recall is essentially unaffected by the normal aging process, even while the person is having increasing difficulty with finding things they are intentionally looking for with strategic recall.[29]

Summary:

- The fact that the ability to record and consciously recall new autobiographical memory could be destroyed, while leaving other kinds of memory (factual/semantic, musical, procedural/performance, classical conditioning, emotional association, experiential belief, behavioral, and priming) intact,
- the different patterns of learning impairment observed between neurological diseases that affect different areas of the brain,
- and the distinctive effects on different kinds of recall observed with the frontal lobe deterioration associated with "normal" aging,

all demonstrate that different kinds of memory are processed by different neurological systems in the brain.

B. Childhood trauma with emotional memory, physical memory, and behavioral memory, but no autobiographical memory: There are many case studies of young children where all the details of trauma were extensively documented, and many of the kids neither reported nor displayed conscious explicit autobiographical memory of the traumatic events, but they displayed emotional memory (they displayed intense emotional reactions to triggers), they displayed physical/somatic memory (they reported pain and other physical sensations that exactly matched the traumatic events, but with no remaining actual physical cause for the pain or sensations), and they displayed behavioral memory (they would re-enact the accurate details of the events if given dolls). Again, this demonstrates that there are different kinds of memory, and that the different kinds of memory are processed differently.[30] **Delete for post version**

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[28] Vargha-Khadem, F., Isaacs, E., & Mishkin, M. "Agnosia, alexia and a remarkable form of amnesia in an adolescent boy." *Brain.* 1994. Vol 117, 683-703, as summarized in Schacter, Daniel L. *Searching for Memory*. (New York: Basic Books) 1996, pages 64-66.

[29] Schacter, Daniel L. *Searching for Memory*. (New York: Basic Books) 1996, pages 283-294.

[30] Terr, L.C. "What happens to early memories of trauma? A study of twenty children under age five at the time of documented traumatic events." *Journal of the American Academy of Child and Adolescent.*

***include also observations/footnotes from Chowchilla kidnapping, Terr's case studies, two other studies referenced in Van Der Kolk. Behavioral memories, physical memories, Emotional associations (triggers, trauma related fears).**

Traumatic memory content coming forward as implicit memory: For a large collection of published case studies that include description of how toxic content from unresolved traumatic memories can come forward as "invisible" implicit memory, see Terr, Lenore C. "Psychic trauma in children: Observations following the Chowchilla school-bus kidnapping." *American Journal of Psychiatry*, 1981, Vol 138, pp 14-19. Terr, Lenore C. *Too Scared to Cry.* (BasicBooks: New York, N.Y.) 1990; Terr, Lenore C. *Unchained Memories: True Stories of Traumatic Memories, Lost and Found*. (BasicBooks: New York, N.Y.) 1994; Terr, Lenore C. "What happens to early memories of trauma? A study of twenty children under age five at the time of documented traumatic events." *J. Am. Acad. Child Adolesc. Psychiatry.* 1988, Vol. 27, No. 1: Pages 96-104.

C. Cognitive psychology laboratory research: When studied in the cognitive psychology laboratory, the different memory systems can be observed to follow different rules:

1. Ease of learning: Different memory systems display different patterns of learning. For example, priming usually occurs quickly and easily, often requiring only one brief study session.[31] Conscious memory for factual material usually happens more slowly, and requires more and longer study sessions. Motor skill learning occurs even more slowly, and usually requires many practice repetitions.[32] ****Better footnote would be ideal (original research if possible)****

2. Changes in study methods: Priming is minimally affected by changes in study methods that dramatically affect "normal" conscious learning. For example, study tasks that cause associative encoding by focusing the subjects attention on meaningful properties of a word (such as whether the word is a noun or a verb) produce much higher levels of "normal" conscious memory recall than study tasks that do not cause associative encoding (such as asking the subject to count the number of vowels in each word). Priming, on the other hand,

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Psychiatry. 1988, Vol. 27, No. 1: Pages 96-104, Terr, L.C. "Psychic trauma in children: Observations following the Chowchilla school-bus kidnapping." *American Journal of Psychiatry*, 1981, Vol 138, pp 14-19. See also Burgess, A.W., Hartmann, C.R., & Baker, T. "Memory representations of childhood sexual abuse." *Journal of Psychosocial Nursing.* 1995, Vol. 33, No. 9, pages 9-16; , as cited in Van der Kolk, Bessel A, McFarlane, Alexander C, Weisaeth, Lars, Editors. *Traumatic Stress: The Effects of Overwhelming Experience on Mind, Body, and Society.* (New York: Guilford Press) 1996, pages 289-291.

[31] For example, priming is clearly demonstrated in one study where subjects had *only one* trial to "learn" 96 words, with each word presented for *only 5 seconds* (Tulving, E., Schacter, D.L., & Stark, H.A. "Priming effects in word-fragment completion are independent of recognition memory." *Journal of Experimental Psychology: Learning, Memory, and Cognition.* 1982. Vol. 8. Pages 336-342).

[32] Schacter, Daniel L., Chiu, C.Y.P., and Ochsner, Kevin N. "Implicit Memory: A Selective Review." *Annu. Rev. Neurosci*. 1993. Vol. 16, pages 159-82, specific comment regarding skill learning on page 161.

is minimally affected by these differences in study method.[33]

3. Need for focused attention, effects of distraction: Recording new material in "normal" conscious memory requires focused attention, and is dramatically disrupted by distraction during the study task. In striking contrast, some of the other memory systems, such as priming, can work even without focused attention and are minimally affected by distraction during the study task. This striking difference can easily be demonstrated in divided attention experiments, such as experiments with dichotic listening. In dichotic listening experiments the subject listens to two different lists of words played simultaneously – one list played through the right side of a set of headphones, and the second list played simultaneously through the left. For example, a list of animals in the right ear and a list of flowers in the left ear. The key is that the subjects are instructed to focus their attention on only one ear, and to ignore the words playing into the other ear. If the study subjects are instructed to attend to the right ear, they will have excellent "normal" conscious recall for the list of animals, but they will have almost no conscious memory of the list of flowers played into the left ear. However, when given word fragments, such as "r_ _ e," and asked to complete them "with whatever comes to mind," they will respond with many of the words from the list of flowers.[34]

4. Effects of interference material during study and/or recall: Priming is not affected by interference material, such as requiring the subjects to study word pairs that contain one of the words from target word pairs combined with a decoy second word. Explicit recall, however, is dramatically impaired by this kind of interference material.[35]

5. Modality specificity: Some kinds of priming, such as priming for new word associations, is specific for sensory modality, which means that the study task and the recall task must both use the same sensory modality. For example, if the study task involves *visual* study of printed words, the retrieval cues must also be presented as *visual* printed words – the priming effect is lost if the sensory modality is changed. Explicit memory, on the other hand, is not modality specific. A person can lay down explicit memory for new word associations by *visual* study of printed words, but then retrieve the material in response to an *auditory* verbal cue.[36]

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[33] See, for example, Jacoby, L.L., & Dallas, M. "On the relationship between autobiographical memory and perceptual learning." *Journal of Experimental Psychology: General*, 1981, Vol. 110, pp 306-340; Bowers, J.S. & Schacter, D.L. "Implicit memory and test awareness." *Journal of Experimental Psychology: Learning, Memory, and Cognition*. 1990. Vol. 16. Pages 404-416. As cited in Schacter, Daniel L., Chiu, C.Y.P., and Ochsner, Kevin N. "Implicit Memory: A Selective Review." *Annu. Rev. Neurosci.* 1993. Vol. 16, pages 159-82.

[34] For discussion of focused attention in explicit memory vs implicit memory, see Siegel, D.J. *The Developing Mind*. (New York: Guillford) 1999, pages 38 & 39. **For original research on focused attention and dichotic listening, see **get references****.

[35] Graf, P., Schacter, D.L. "Selective effects of interference on implicit and explicit memory for new associations." *Journal of Experimental Psychology: Learning, Memory, and Cognition*. 1987. Vol. 13, pages 45-53.

[36] Schacter, D.L., Graf, P. "Modality specificity of implicit memory for new associations." *Journal of Experimental Psychology: Learning, Memory and Cognition*. 1989. Vol. 15. Pages 3-12.

6. Forgetting: Extensive research clearly demonstrates a sad reality that we are all aware of -- that conscious recall of explicit memory material declines steadily over time, with significant forgetting occurring even within hours of studying material one is trying to remember.[37] However, research studying certain kinds of priming phenomena shows *almost no forgetting*, even when the priming responses are tested days, weeks, months, or even a *year* after the initial training.[38]

7. Time of onset: There are some memory systems that are functioning even before birth, but conscious autobiographical memory does not begin to develop until 18 months to 3 years.

Practical note re time of onset: The hippocampal filing system and cortical consolidation that enable recall of explicit autobiographical memory many years later are usually not in place until 3-4 years of age. "Implicit memory only" phenomena are therefore very important until at least 3-4 years old, and actually longer into childhood because implicit-explicit integration at the time of events is hindered by trauma.[39]

8. Developmental pathway: "Normal" conscious memory improves steadily during childhood development – a 6 year old learns more easily and remembers more than a 3 year old, a 9 year old learns more easily and remembers more than a 6 year old, and a 12 year old learns more easily and remembers more than a 9 year old. In contrast, priming and related kinds of implicit memory are already fully functional at birth, and seem to remain almost completely

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[37] For an interesting, "written for lay people" discussion of the research regarding the usual patterns of forgetting seen with conscious, explicit material, see Schacter, Daniel L. *The Seven Sins of Memory: How the Mind Forgets and Remembers*. (New York: Houghton Mifflin) 2001, chapter 1 (pages 12-40).

[38] Glisky, E.L., Schacter, D.L., & Tulving, E. "Computer learning by memory-impaired patients: Acquisition and retention of complex knowledge." *Neuropsychologia*, 1986. Vol. 24. Pages 313-328; Glisky, E.L., Schacter, D.L. "Long-term retention of computer learning by patients with memory disorders." *Neuropsychologia*. 1988. Vol. 26. Pages 173-178. Both as cited in Schacter, Daniel L. *Searching for Memory*. (New York: Basic Books) 1996, page 177. Tulving, E., Hayman, C.A.G., MacDonald, C. "Long-lasting perceptual priming and semantic learning in amnesia: A case experiment." *Journal of Experimental Psychology: Learning, Memory, and Cognition.* 1991. Vol. 17, pages 595-617. As cited in Schacter, Daniel L., Chiu, C.Y.P., and Ochsner, Kevin N. "Implicit Memory: A Selective Review." *Annu. Rev. Neurosci*. 1993. Vol. 16, pages 159-82. Tulving, E., Schacter, D.L., & Stark, H.A. "Priming effects in word-fragment completion are independent of recognition memory." *Journal of Experimental Psychology: Learning, Memory, and Cognition.* 1982. Vol. 8. Pages 336-342.

[39] Note that there are two separate onset times with respect to explicit autobiographical memory: 1. autobiographical memory in the child at the time of events – the child remembers and can talk about their past personal experience, for events days, weeks, months in the past (and this usually starts ~18 months - 2 years old), 2. Adult memory of childhood autobiographical events (permanent, cortical consolidation storage as opposed to just long-term storage still mediated by the hippocampus and not cortically consolidated). This usually starts ~3-4 years old. Pillemer, D.B., White, S.H. "Childhood events recalled by children and adults," *Advances in Child Development and Behavior.* 1989, Vol. 21, pages 297-340; Sheingold K., Tenney Y.J. "Memory for salient childhood event." In U. Neisser (Ed.), *Memory observed: Remembering in natural contexts*. (San Francisco, CA: W.H. Freeman) 1982, pages 201-212; Usher J.A. & Neisser U. "Childhood amnesia and the beginnings of memory for four early life events," *Journal of Experimental Psychology: General*, 1993, Vol. 122, No. 2, pages 155-165; Wetzler, S.E & Sweeney J.A. "Childhood amnesia: An empirical demonstration." In De. Rubin (Ed.), *Autobiographical memory*. (Cambridge: Cambridge University Press) 1986, pages 191-201.

unchanged through childhood development.[40]

These data points all indicate that there are different memory systems that follow different rules.

D. Functional neuroimaging studies (fMRI, SPECT, PET): The very short summary is: "you can see different brain regions and pathways light up when the experimental subject uses different memory systems."[41] For example, the hippocampus *does not* light up when priming memory functions are active, but *does* light up when a person intentionally and consciously recalls recently learned factual material.[42]

III. Explicit Memory vs Implicit Memory: For those in emotional healing ministry, one of the most important distinctions regarding different memory systems is between Explicit memory and Implicit memory.

Explicit memory: Explicit memory recall is what we all think of as "remembering." Explicit memory autobiographical content *feels* like "normal" memory. When we recall events through the explicit memory system, it *feels, subjectively,* like "I'm remembering something from my personal past experience." Daniel Schacter, the psychologist who first proposed and discussed the terms "Explicit" and "Implicit" memory,[43] states: "In order to be experienced as a memory, the retrieved information must be recollected in the context of a particular time and place and with some reference to oneself as a participant in the episode."[44] Referring to explicit/episodic[45] memory, Endel Tulving comments: "Remembering, for the rememberer, is mental time travel, a

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[40] Naito, M., & Komatsu, S. "Processes involved in childhood development of implicit memory." In P. Graf & M.E.J. Masson (Eds.), *Implicit memory: New directions in cognition, development, and neuropsychology* (Hillsdale, NJ: Ealbaum) 1993, pp 231-264. As cited in Schacter, Daniel L. *Searching for Memory*. (New York: Basic Books) 1996, page 175.

[41] For general discussion of functional imaging and implicit memory. See Daniel L. Schacter, *Searching for Memory*, (New York: Basic Books, 1996), pages 185-188.

[42] Schacter, D.L., Alpert, N.M., Savage, C.R., Rauch, S.L., & Albert, M.S. "Conscious recollection and the human hippocampal formation: Evidence from positron emission tomography." *Proceedings of the National Academy of Sciences, USA*, 1996, Vol. 93, pages 321-325, as cited in Schacter, Daniel L. *Searching for Memory*. (New York: Basic Books) 1996, page 185. Peterson S.E., Fox P.T., Posner M.I., Raichle M.E. "Positron emission tomographic studies of the cortical anatomy of single-word processing," *Nature*. Vol. 331, 1988, pages 585-589. As cited in Schacter, D.L., "Understanding implicit memory: A cognitive neuroscience approach." *American Psychologist*, 1992, Vol. 47, No. 4, pages 559-569.

[43] For the original discussion of explicit and implicit memory, see Graf, P., & Schacter, D.L. "Implicit and explicit memory for new associations in normal subjects and amnesic patients." *Journal of Experimental Psychology: Learning, Memory, and Cognition,* (1985). Vol 11, pages 501-518.

[44] Schacter, Daniel L. *Searching for Memory*. (New York: Basic Books) 1996, page 17.

[45] My understanding is that the terms "explicit memory" and "episodic memory" both refer to the same phenomena, but focus on different aspects of explicit/episodic memory. That is, "explicit" focuses on the person is aware of remembering, and has the subjective experience of "I am remembering," and "episodic" focuses on "the content is perceived as material from the person's autobiographical past." Note: this can refer to material from a book or movie, but the person experiences "I'm remembering something from a book I read/movie I saw...."

sort of reliving of something that happened in the past."[46] By definition, explicit memory includes source information (at least some vague sense/awareness/guess regarding source).

Autobiographical memory: Autobiographical memory is the narrative story of yourself, in time. Explicit, conscious autobiographical memory uses medial temporal lobe structures and both hippocampi to record and retrieve new and long term (but not permanent) memory. Note: for most of our memories (~5 years old and onwards), implicit emotional content is smoothly included and integrated with explicit content when we recall autobiographical events. For example, if you ask me to remember an embarrassing event, my explicit strategic recall system will retrieve my memory of having diarrhea in second grade, *and* I will feel the associated thoughts and emotions as I remember and describe this autobiographical event. From my understanding of Schacter, if my amygdala were damaged, I could retrieve my second grade diarrhea memory through the explicit system, but I wouldn't feel any shame (the implicit, emotional association component has been stripped off). If my hippocampus were damaged, I could go to the Central School bathroom, and experience shame as an implicit emotional association memory, but I would not have any insight as to where it was coming from (I would not recall the explicit memory of the autobiographical event).

Semantic memory: Semantic memory is conceptual and factual memory. The memory of facts, such as "Springfield is the capital of IL," and the memory of concepts/principles, such as understanding how old traumatic memories can cause emotional symptoms in the present. Note that semantic memory content can be stored and retrieved through either explicit or implicit memory systems. In my understanding, when semantic memory is processed through the explicit memory system, it is actually a form of autobiographical memory – you recall the information in the context of remembering the autobiographical experience of learning it.

Implicit memory: Implicit memory is all memory phenomena that *does not* include the subjective experience of "I'm remembering something from my personal past experience." Implicit memory content *does not* feel like "normal" memory. When we recall and/or use "learned" information through one of the implicit memory systems, we usually don't have any awareness that we are remembering or being affected by past experience. For example, even in normal subjects, priming can be demonstrated for material that the study subject doesn't even recognize as having been included in the learning task material.[47] Experiments show that people tend to prefer products featured in advertisements, even when they barely glance at the ads and have no conscious memory of seeing the ad.[48] And many well documented case studies of childhood trauma show that children display physical memories, behavioral memories, emotional memories, and conceptual/cognitive schema/lie memories for traumatic events for which they do

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[46] Tulving, E. *Elements of episodic memory.* (Oxford: Clarendon Press) 1983, Page 127, as cited in Schacter, Daniel L. *Searching for Memory*. (New York: Basic Books) 1996, page 17.

[47] Graf, P. & Schacter, D.L. "Implicit and Explicit Memory for New Associations in Normal and Amnesic Subjects." *Journal of Experimental Psychology: Learning, Memory, and Cognition*. 1985. Vol. 11, No. 3, pp 501-518; Tulving, E., Schacter, D.L., & Stark, H.A. "Priming effects in word-fragment completion are independent of recognition memory." *Journal of Experimental Psychology: Learning, Memory, and Cognition.* 1982. Vol. 8. Pages 336-342.

[48] Perfect, T.J., & Askew, C. "Print adverts: Not remembered, but memorable." *Applied Cognitive Psychology,* 1994, Vol. 8, pages 693-703.

not have conscious, explicit, autobiographical memories.[49]

Even if we are aware that we are being affected by some kind of memory phenomena (for example, we learn to recognize emotional triggering as an implicit memory phenomena), we still don't have the subjective experience of "I am remembering something from my personal past experience." By definition, implicit memory does *not* include source information.

1. Semantic: People with brain injury causing profound explicit amnesia can learn semantic information through their implicit system, but have no memory of where they learned it, and will usually come up with a confabulatory left-hemisphere explanation if questioned about the source. For example: I ask about some piece of semantic information that the person doesn't already know – "what's the fastest animal in the world?," to which the person responds "I don't know." I then inform him that the answer is "Peregrin falcon, with diving speeds up to 210 m.p.h." An hour later, the person with explicit memory amnesia has no conscious memory of our previous interchange regarding nature trivia, but when I ask "what's the fastest animal in the world?" he responds immediately and confidently with "Peregrin falcon, with diving speeds up to 210 m.p.h." If I then ask "How do you know that?," I will get a response along the lines of "it just seemed like the right answer," or "I think I read it in a magazine last week."[50]

2. Procedural/performance (skill learning): Habit learning, uses basal ganglia.

3. Perceptual recognition (priming): Uses perceptual cortexes (visual cortex for visual memory, auditory cortex for auditory memory, etc).

4. Emotional associations: These unconscious, automatic emotional associations are "learned" and remembered through an implicit memory system. This is consistent with our subjective experience (these associations don't feel like explicit remembering), and is also demonstrated in carefully documented case studies of patients who have lost their explicit memory system but who can still learn new emotional associations (examples discussed above).

Emotional associations do not just include lie-based negative responses. That is, they can be either positive or negative, and can be either lie-based or truth-based.[51] Examples: Truth-based

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[49] Terr, L.C. "What happens to early memories of trauma? A study of twenty children under age five at the time of documented traumatic events." *J. Am. Acad. Child Adolesc. Psychiatry.* 1988, Vol. 27, No. 1: Pages 96-104, Terr, L.C. "Psychic trauma in children: Observations following the Chowchilla school-bus kidnapping." *American Journal of Psychiatry*, 1981, Vol 138, pp 14-19. See also Burgess, A.W., Hartmann, C.R., & Baker, T, "Memory representations of childhood sexual abuse." *Journal of Psychosocial Nursing*, 1995, Vol. 33, No. 9, pages 9-16 as cited in Van der Kolk, Bessel A, McFarlane, Alexander C, Weisaeth, Lars, Editors. *Traumatic Stress: The Effects of Overwhelming Experience on Mind, Body, and Society.* (New York: Guilford Press) 1996, pages 289-291.

[50] See Schacter, D.L., Harbluk, J.L., & McLachlan, D.R. "Retrieval without recollection: An experimental analysis of source amnesia." *Journal of Verbal Learning and Verbal Behavior*, 1984, Vol 23, pp 593-611 for research carefully documenting these phenomena. See also Schacter, D.L. *Searching for Memory*. (New York, NY: Basic Books) 1996, pp 165 & 166 for a description of his first experience with a patient demonstrating these phenomena.

[51] See "Healthy, *Truth-based* Emotions and Associations" on the "Articles and FAQs" page of www.kclehman.com for additional discussion of positive and negative emotional associations that are appropriate and *truth-based*.

negative associations would be learned fear/caution, of appropriate intensity, for things that are dangerous and/or cause pain. A truth-based positive association would be the way in which warm, positive emotions come forward spontaneously when I hear certain songs that Charlotte and I listened to together during our courtship.

Emotional memory – learning new emotional associations – does *not* need the hippocampus or medial temporal lobe structures that are required for explicit memory, but it *is* completely blocked if the amygdala is damaged.[52]

5. Cognitive schema/beliefs: Implicit memory is where we carry cognitive schema/beliefs about ourselves and the world. These are beliefs that *feel* true, such as "I'm smart" or "I'm stupid," as opposed to cognitive semantic information that we simply *think* is true, such as "hydrogen is the first element on the periodic table." Note that this kind of cognitive schema/belief is *experiential* knowledge, and that this implicit-memory experiential knowledge can include truth as well as lies. For example, I can have a true schema/belief, such as, "Charlotte is trustworthy," base on many consistent experiences of Charlotte demonstrating trustworthiness, and I can have a distorted, false schema/belief, such as, "I'm stupid," based on experiences of having dyslexia and being unable to learn to read when all of the other kids in my class were able to do this.

6. Conditioned responses: conditioned responses, such as Pavlov's famous dog that "learned" to salivate when the bell was rung, are unconscious, automatic behaviors that are learned and remembered through an implicit memory system.

7. Unresolved, undigested, "flashback" type memories of traumatic events: Note that people consistently experience these as subjectively, qualitatively different than "normal" memories, even including "normal" memories of other emotionally intense positive or negative events (e.g., weddings, births, graduations, and traumatic events that were painful but not overwhelming to the point of dissociation).[53] Flashback memories can include:

- Somatic (what your body felt like at the time of the memory)
- Perceptual (other sensory perceptions – sight, sound, smell, taste)
- Emotional (emotions at the time)
- Behavioral (what you were doing with your body).

8. Non-flashback physical memory: Non-flashback implicit memory physical memory can include all the same components as flashbacks, but it is qualitatively different than flashbacks. The person experiences the subjective sensations to some degree, but milder, less vivid, and does *not* have the subjective perception that they are actually back in the original experience – the person does *not* feel like they are *reliving* the original experience. An example would be

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[52] LeDoux, J.E. "Emotion as memory: Anatomical systems underlying indelible neural traces." In S. Christianson (Ed.), *The Handbook of emotion and memory: Research and theory*. (Hillsdale, NJ: Erlbaum). 1992, page 269-288, and LeDoux, J.E. "Emotion, memory, and the brain. *Scientific American*. 1994. Vol 270, pages 32-39 as cited in Schacter, Daniel L. *Searching for Memory*. (New York: Basic Books) 1996, pages 213-214.

[53] Van der Kolk, Bessel A, McFarlane, Alexander C, Weisaeth, Lars, Editors. *Traumatic Stress: The Effects of Overwhelming Experience on Mind, Body, and Society.* (New York: Guilford Press) 1996, pp 287-9.

children who have non-flashback behavioral memory – they act out the trauma with their bodies, even though they don't remember the event consciously or have any insight into why they are engaging in the repetitive re-enactment behavior.

Lack of consensus, sloppy thinking: Many different researchers, authors, and ministry leaders use the terms explicit memory and implicit memory, with a fair amount of variability, and sometimes also with sloppy thinking. For example, there are a number of concepts that are often presented as if they are equivalent terms, but that actually only partially overlap, such as implicit memory and emotional memory. (Emotional memory is a subset of implicit memory, as opposed to being equivalent terms.) When you see "explicit memory" and "implicit memory" used in other material, be aware of the possibility that the author may not be using the terms in exactly the same way we are using them here.

Summary regarding explicit memory vs implicit memory:

1. Subjective experience:

   Explicit: Again, explicit memory recall is what we all think of as "remembering." Explicit memory autobiographical content *feels* like "normal" memory. When we recall events through the explicit memory system, it *feels, subjectively,* like "I'm remembering something from my personal past experience."

   Implicit: Again, implicit memory is all memory phenomena that *does not* include the subjective experience of "I'm remembering something from my personal past experience." Implicit memory content *does not* feel like "normal" memory. When we recall and/or use "learned" information through one of the implicit memory systems, we usually don't have any awareness that we are remembering or being affected by past experience.

2. Hippocampus and medial temporal lobes:

   Explicit: The hippocampi and medial temporal lobes are involved only for long term explicit memory content. Neither immediate/"working" explicit memory or permanent explicit memory use these structures.

   working memory (immediate – doesn't use hippocampus and medial temporal, because these can be destroyed and working memory is still maintained),

   Long term (does require hippocampus and medial temporal),

   Permanent with cortical consolidation (note: again, does *not* require hippocampus and medial temporal. Can be accessed even though these are destroyed).

   Implicit: Implicit memory does not require involvement of the hippocampus or medial temporal lobes.

3. Conscious, nonconscious:

   Explicit: Explicit memory is thought of as conscious, but dissociated parts can carry explicit autobiographical memory content that is not normally accessible to the conscious mind. Fugue states are an especially dramatic example, with dissociated parts carrying large blocks

of apparently "normal" explicit autobiographical memory.

Implicit: Implicit memory phenomena are thought of as being nonconscious, but one can learn to recognize some implicit phenomena (such as ....) so he is routinely consciously aware of most implicit content and phenomena.

4. Content:

Explicity: Autobiographical memory is always explicit, and semantic memory can be explicit. Semantic memory is especially accessed through the explicit/strategic recall process when recall includes trying to reconstruct the context in which the material was learned.

Implicit: Both case studies and careful research show that semantic memory storage and recall can both occur through an implicit memory system. And as already mentioned above, implicit memory can include content other than autobiographical and semantic, such as emotional associations, various content from unprocessed trauma, perceptual recognition (priming), motor skills, and Pavlovian conditioned responses.

5. Left brain, right brain: My assessment is that there are no significant left brain/right brain distinctions between explicit and implicit memory. A simple, dramatic data point indicating that both left and right hemispheres are involved in explicit memory is that injury to either right or left hippocampus and medial temporal structures produces minimal memory impairment. Both sides must be removed/damaged to get dramatic explicit amnesia.

6. Early development vs late development:[54]

Explicit: Explicit memory is not available until the hippocampus mylenates, and strategic search/recall must wait for development of the frontal lobes. Note that explicit memory does not replace implicit memory, but rather is added to it.

Implicit: Implicit memory is available even before birth, and continues throughout life.

7. Associative recall vs strategic recall:

Explicit: Strategic recall and associative recall can both access explicit autobiographical content and explicit semantic content.

Implicit: Strategic recall cannot access any of the forms of implicit memory. Associative recall can access all forms of implicit memory. Another way to say this is that all implicit memory phenomena is associative, and only associative.

IV. Practical implications/applications:

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[54] Possible references for time line re hippocampus, and also for other memory being "on line" earlier: Humphrey, T. "The development of the human amygdala during early embryonic life," *Journal of Comparative Neurology*, Vol. 132, 1968, pages 135-166; Nadel, L., & Willner, J., "Some implications of postnatal maturation of the hippocampus." In V. Chan Palay & C. Kohler (eds), *The hippocampus – new vistas*, (New York: AR Liss), 1989, pp 17-31; Nadel, L. & Zola-Morgan, S. "Infantile amnesia: A neurobiological perspective." In M. Moscovitch (Ed), *Infant Memory* (New York: Plenum), 1984, pp 145-172.

A. Multiple memory systems: Pay attention to neurological pathways and communication modalities that seem to work especially well for a given person. Does writing access memories more effectively than talking? or vice versa? Notice that many people find that reporting mental content, out loud, is very important and helpful in connecting with emotions. Does music, or touch/massage, or motor movement help access memory content? Notice that many people find that it is helpful to pay attention to/focus on physical sensations. The research on multiple memory systems encourages us to be creative and pay attention to what works as we develop the most effective memory-access tool box.

B. Community can help identify/recognize implicit memory: As described above, an inherent part of the experience of implicit memory being activated is that it doesn't feel like memory, but rather feels true and valid in the present. Another way to say this is that an inherent part of the experience of having implicit memory triggered forward is for it to be subjectively invisible *to the person who is being triggered*. The good news is that it is much easier for *others* in the community to identify/recognize when implicit memory is being triggered forward. Therefore, an important role for community is to help each of us identify/recognize when we are triggered with implicit memory content coming into the present. The ideal is for our community to understand triggering, implicit memory, and the verbal logical explainer, and for our community to know how to attune to our triggered content without agreeing, but then gently help us to see that implicit memory is triggered forward.[55]

C. Implicit, explicit developmental time line: Simple developmental considerations result in most very early memories (before 2-3 years of age) being "implicit memory only." Early childhood memories (2-6 years old) often have separate implicit and explicit components. Being aware of this developmental time line can help us avoid unnecessary confusion about why we can't find explicit autobiographical components for early experiences, and help us avoid wasting time and energy searching for explicit autobiographical memory that's not there. Being aware of this developmental time line can help us avoid invalidating and shutting down implicit-memory work just because we can't find the explicit autobiographical story to go with it.

You can work with trauma that includes only implicit memory if you realize that this is what is happening and validate it. My experience with traumatic memories around my two- year-old separation from my parents provides a good example. For many years I failed to recognize this memory content for what it was, and then invalidated and dismissed it, because it was all implicit memory with no corresponding explicit autobiographical content. Part of the eventual healing breakthrough was finally realizing that I was dealing with early trauma that was carried as implicit memory only, and then giving myself permission to stay with it and work with it. I have gotten a lot of healing as a result of implicit-memory-only work.

D. Indistinct implicit memory packages vs distinct internal parts: It is important to understand that recipients can have traumatic implicit memory, but without discrete internal parts (neither implicit-child-ego-state packages nor dissociated internal parts). If you try to access the memory by using direct eye contact and trying to speak to/work directly with an internal part, the recipient will stare at you blankly and say things like "I don't feel any resistance to going to the memory/emotions, I just don't know how to get there." If you do not

[55] For a discussion of attunement without agreement, See Karl Lehman, *Outsmarting Yourself*, second edition, (Libertyville, IL: This Joy! Books, 2014), pages 247-250.

understand implicit memory phenomena, you will assume either there is nothing there or conclude there are internal parts that the person is choosing to withhold. Instead, try tools to access implicit memory.

Also, you can introduce unnecessary complexity by pursing and/or trying to work with parts that aren't there. Delete for post: This is especially valuable in situations where the people involved are already at their limits with respect to weirdness.

E. Implicit memory parts vs dissociative parts: I think it is helpful to recognize implicit memory internal child parts (implicit memory child ego-state packages) as being a qualitatively different phenomena from dissociated internal parts. If (as is my current assessment) they really are two different phenomena, then it will certainly cause confusion and trouble at some point to refer to both of them with the same term.

Implicit memory internal child parts/child-ego-state packages: the person may look, sound, and act like a child at the age of the memory, but you relate to the person as being her adult self blended with, and co-conscious with the child ego state package. You can use language as if you are talking directly to 8 year-old Karl, and I can use language as if I am talking directly from 8 year-old Karl; ***and*** we can also smoothly and easily transition back and forth with language that recognizes I am 64 years old in the present, but thinking, feeling, and responding from the perspective of myself in the 8 year-old memory. Implicit memory internal child parts don't use plural pronouns (e.g., "we," "us"), and don't refer to the adult in third person. My experience with implicit memory internal child parts is that they can carry guardian lies and other concerns (e.g., vows) that need to be addressed (the person carries these things from "inside" the child memories), but use of internal family systems principles and techniques is difficult and usually unnecessary.

Dissociated internal parts: functional alters will relate to you as if the person receiving ministry is an entirely different person. Dissociated child parts of the core self will acknowledge "I am _____ at 7 years old," but will also refer to the person receiving ministry in third person (note: in Sybil, parts of the core self from different ages had different names, and did *not* readily acknowledge that they were Sybil at different ages, but some of these parts *did* carry portions of her core self time line). My experience is that dissociated internal parts spontaneously use plural personal pronouns, such as "we," and will spontaneously refer to the adult person receiving ministry with third person language. Dissociated internal parts seem to appreciate it when I recognize the reality of their existence by using the same language they use, and sometimes seem offended and invalidated if I insist on using language that tries to downplay their semi-autonomy and importance. When working with dissociated internal parts, use of internal family systems principles and techniques is easy and often important (it usually seems easy and helpful to work with dissociated internal parts as if they really are a family system).

F. Focus on modalities and content usually carried in implicit memory: A very practical tip for working with implicit memory content is to focus on modalities and content that are usually carried in implicit memory. Trying to use logic to figure out where the triggered implicit memory content is coming from usually works poorly. Trying to use your strategic search function to find the underlying source memories usually works poorly. Instead, try to stay with, focus on, and lean into modalities and content that are carried in implicit memory. For example:

Emotions that come forward when you are triggered
Thoughts (schema/cognitive models) that *feel* true when you are triggered
Sensory fragments that spontaneously come into your awareness when you are triggered:
  Visual imagery sensory fragments
  Physical memories (physical sensation sensory fragments)