

Amygdalae and Brain Change

New Knowledge: Changes Details, but Not the Main Message!

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Recently, with some help from a friend, I reviewed some recent studies on amygdalae function. The studies indicated that the distinction of sides and the details about which side drives which emotional reactions have changed. My earlier discoveries and share-outs will be replaced with some new data and information.

So, change happens, and we adapt. Here is what is still true. Our primitive brains still contain two amygdalae. These structures are hardwired into our system to help us **survive**! They keep us alive, keep us out of danger, help us find what we need to survive, and drive us toward moments of pleasure, satisfaction, and joy.

The amygdalae serve as sentries to **alert us** of incoming dangers or risky situations, as well as guide us in ways we get our **needs** met and pleasures found and fulfilled. When sensing **danger**, these structures immediately take control over the inner engine system and send a **rush** of chemicals (adrenaline and cortisol) throughout the body to provide what is helpful in emergency situations where quick reactions might help us survive. We will have incredible strength, greater speed, intense focus, and lack of pain awareness, in addition to heightened alertness, arousal, blood pressure, blood sugar, heart rate, and reaction speed. All of this is designed for escape or to overwhelm or eliminate that which threatens, when there is a clear and present danger. It helps when death or severe injury is imminent.

The system also triggers in order to get needs met. The goal is to grab nourishment and hydration when food and drink are available, to seek a safe place to eat, and to rest and recover. The amygdalae are the structures that crave the regular release of chemicals that give pleasure, such as endorphins, serotonin, dopamine, and oxytocin. The amygdalae also crave chemicals that give excitement, such as adrenaline. The tricky part is that, once the amygdalae find *something* that gives immediate pleasure or relief, that *something* can become a needed and much sought-after item, although it is actually problematic in the bigger picture. Thus, they are a key player in addictive behaviors such as alcohol or drug consumption, gambling, overeating, sexual activity, speeding, extreme sports, and over-exercising. The rush of excitement can become so sought after that safety is abandoned.

One final strength of the amygdalae is that they use their strong connection to the hippocampal areas to **remember** what feels good and to avoid that which was uncomfortable, risky, or potentially dangerous. They guide us back to places and situations where we found pleasure before, and they push the hippocampi to increase the frequency of pleasure moments and slow down possible painful episodes. These small structures, in fact, play a *huge* role in how we live each and every day. The function and malfunction of the amygdalae system still create challenges in care support and environmental support when someone is living with dementia. When we combine the

abilities of these two structures with the malfunctioning hippocampi, crises seem to be happening when and where they are not, and yet major problems occur when and where someone sees none! In almost all dementias, there are changes in the hippocampal areas of learning and remembering the details of new things, wayfinding from place to place and back, and keeping up with the passage of time.

Damage to the hippocampi tricks the amygdalae into quickly acting out with erroneous information, even early in the condition. The touch on your shoulder was not an attack, just your spouse trying to get your attention while you are online. It has been two days, not two hours, since you took a shower. You missed the first turn in a series of four, so now you are panicking and angry because nothing is where it should be, and you can't get your brain to reason it out. Perhaps an older habit of seeking out alcohol to deal with discomfort or pain may return with a vengeance, and when combined with limited ability to keep up with how much you have consumed, results in brain-damaging binge drinking, without your conscious desire to do so.

Later in the condition, the primitive amygdalae may well cause you to seek only glucose-rich food sources because they give you a quick rush of energy and pleasure. Or you might become totally intolerant of background noises in a common space or group gathering, as they can't be sorted out from foreground sounds and are frightening or overwhelming. Friendly efforts to help you change soiled or wet clothing may be viewed by the amygdalae as an attack or invasion, resulting in an all-out battle for existence.

As we, at PAC, are learning more about how abilities and brain abilities change over the course of various dementias, we continue to check back on what we share out and try to make sure we change our content to match evolving awareness and knowledge.

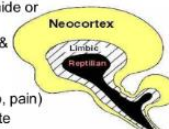
So here is our latest interpretation of what is known:

Top Five Human Needs and Emotional Indicators of Distress	
Five Expressions of Emotional Distress	Five Human Needs
Angry irritated – angry – furious	Intake Hydration, nourishment, meds
Sad dissatisfied – sad – hopeless	Energy Flow tired or revved up directed inward or outward
Lonely solitary – lonely – abandoned/trapped	Output Urine, feces, sweat, saliva, tears
Scared anxious – scared – terrified	Comfort 4 Fs and 4 Ss
Lacking Purpose disengaged – bored – useless	PAIN Free!!! Physical, emotional, spiritual

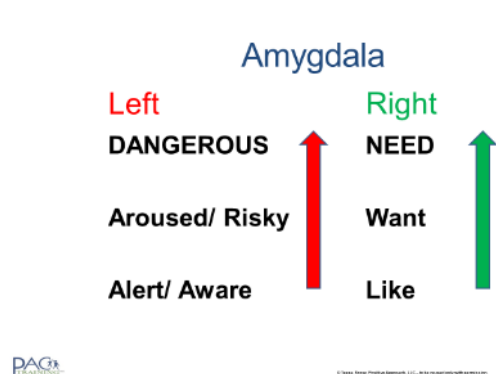
STILL TRUE

Primitive Brain is in Charge of:

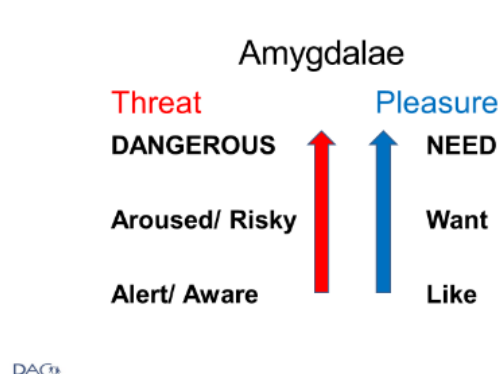
- Survival –**
 - Autonomic protective – fright, flight, fight + hide or seek
 - Pleasure seeking – meeting survival needs & finding joy
- Thriving – Running the Engine**
 - Maintain vital systems (BP, BS, O₂sat, Temp, pain)
 - Breathe, suck, swallow, digest, void, defecate
 - Circadian rhythm
 - Infection control
- Learning New and Remembering:**
 - Information
 - Places (spatial orientation)
 - Passage of Time (temporal orientation)



STILL TRUE



OLDER INACCURATE INFO



NEW and ACCURATE INFO

The scales of distress and pleasure seeking/needs meeting still seem accurate and important to understand. Humans seek to be comfortable, pain free, and to avoid threats and danger, although they do need to find moments of joy and get their needs met to be satisfied!

Scale of Emotional States – Perceived Threats to Person - Distress

Low – Amygdalae Active Aroused - Concerned	Medium – Amygdalae Stressed at Risk	High – Amygdalae in Control Endangered
Irritated Bothered Dissatisfied Blue	Angry Frustrated Sad Unhappy	Furious Enraged Devastated Hopeless
Missing <i>it</i> – Not getting <i>it</i> Missing freedom/control	Lonely – Disconnected Confined/restricted	Abandoned – Isolated Imprisoned
Nervous Anxious Disengaged Antsy	Scared Worried Bored Roaming	Terrified Panicked Useless – Purposeless Frantic

Scale of Emotional States - Perceived Pleasure for the Person – Satisfying Needs

Low – Amygdalae Active <i>Liking it</i>	Medium – Amygdalae Stressed <i>Wanting to Do More</i>	High – Amygdalae in Control <i>Need Something</i>
Excited	Hyped Up	Hysterical
Happy	Boisterous	Slap Happy or Delirious
Connected or In Control	Trying hard to get “it”	Controlling or Clingy
Energized	Rev’ed	Racing Around
Full of Purpose	Committed	Demanding Others Get Purpose

BOTH are STILL ACCURATE

What the amygdalae do is still accurate, but how they combine left and right to do it, is what is different. One of several things may account for this shift in thinking and findings:

- We have more ways of investigating this part of the brain with new imaging studies done with various people, who have various mental and physical health and wellness changes.
- Men and women may be different in how their amygdalae are wired-in from an evolutionary background or genetic coding perspective.
- People with specific conditions have wiring that is different, and they were some of the early groups studied through behavioral observation and limited imaging.
- I missed some key articles and studies and I was just mistaken, and now we have new and better data.

In all cases, what is vitally important is that we appreciate the **power** of these structures in human beings. Our thinking and cognitively guided brains are not able to control these guys once they get in the **red zone**. When we are alert and aware, however, we can guide ourselves and the people we are trying to support and help **back down** through the use

of distress-reducing techniques and likes-/wants-/needs-meeting strategies that keep each of us from approaching that **danger zone** of danger or unmet needs. But, it takes attention and skill. It requires us to take care of our brains and our bodies if we are going to be successful in the long run of supporting someone living with dementia from the beginning of the condition until the end of the journey. We will *need* to learn new ways of responding and notice when changes are making life distressing or pulling up old and risky coping strategies. We will actually require our external monitors for our status, since we are in the middle of the situation and may be amygdalae-driven as well.

Another still-true piece of this amygdalae puzzle is that when the human brain changes *so much* that it no longer recognizes the need for sustenance for survival, the only reason the person continues to take a bite or take a drink is our relationship with them. We are frequently allowing *our* amygdalae to drive our interactions and demands on the *other* person. I would be starving if I didn't eat. I would be dying of thirst if I didn't drink something. That person is not in the same state as we are. They are dying, and that is why they are no longer craving food or drink. It is time for them to leave us. But, if we keep demanding that for our comfort they take in more, then they are only staying here for us. I believe we have the responsibility of asking ourselves and asking that person: "What have they *not* done that they *need to do* before they go?" Be truly curious about the possible answers, and attempt to solve the puzzle, if possible. And then, be prepared to allow the person to go or stay based on what you discover and can do.

In conclusion, I am sorry for the mistake on left-right amygdalae function. Glad it was just a left-right thing and not an overall function thing. Take a deep breath, and let's move forward with what we now know to keep on changing the culture of taking care of someone to one of *just-right* support for all of us!