

Research Update

David Center

In an earlier piece on the brain and meditation, I discussed what in neuroscience is called the "default mode network." In that section, I relabeled the default network as the "relaxed attention network" (RAN) and the alternate state as the "focused attention network" (FAN). Below are excerpts from that section that review my hypothesis about the function of the "default network" or "relaxed attention network (RAN)."

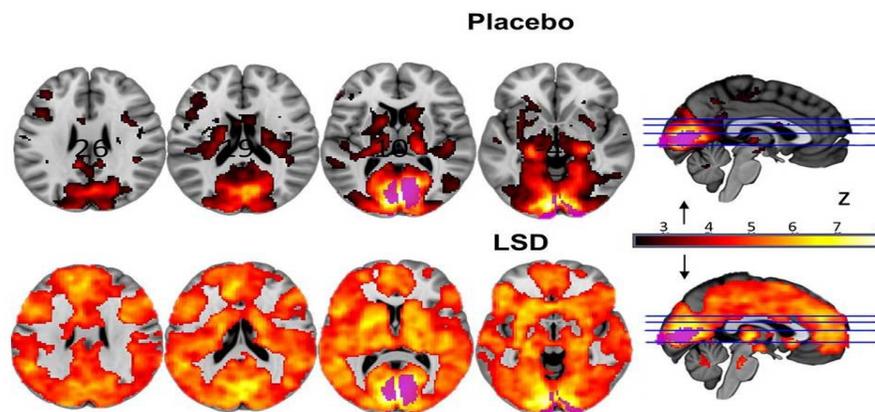
"When RAN is engaged, what you get appears similar to free association or random presentation. In this state, thoughts, memories, images and feelings stream into awareness often with little or no apparent structure. As long as these stimuli stream, you remain in RAN. However, if you focus on one or more of these stimuli and begin to engage with it, FAN comes back into operation. Thus, FAN can be focused on either an external or an internal task. To illustrate the process of going from RAN to an internal version of FAN, think of standing in front of a conveyor belt and watching suitcases streaming by. This is analogous to RAN-generated thoughts and images streaming through awareness. If you grab one of these suitcases off of the conveyor belt and begin unpacking it, this is analogous to focusing on one thought or image and following a chain of associations elicited by your attention to it. You are now back in FAN. This, however, is usually a less engaged level of FAN than the level, for example, required for solving quadratic equations or teaching someone to read. This suggests that there are degrees of FAN and RAN, meaning that they are not "digital" states that are either on or off.

"My introspective observation is that RAN is largely responsible for the creation of a fictive-self, self-narrative or ego and especially for maintaining and reinforcing it [emphasis added]. One way of thinking about the ego is as a psychological construct that functions as the subject or "doer" assigned responsibility for our activities. This fictive-

self begins forming early in the developmental period and generally becomes stronger as a child ages into an adult. It seems to me, again from introspective observation, that most of the activity generated by RAN is to bring into awareness thoughts, images and memories associated with our experiences. These become the "bricks" from which we build, repair and reinforce our fictive-self."

Now, a recent study discussed in the *New Scientist* has provided evidence that supports my hypothesis:

"The team gave 20 volunteers infusions on two days, once containing 75 micrograms of LSD, the other [day] a placebo. Then volunteers lay in a scanner and had their brains imaged with three different techniques, which together built up a comprehensive picture of neural activity, both with the drug and without.



Carhart-Harris et al.

MRI scans showed that LSD caused brain activity to become less coordinated in regions that make up what is called the default mode network. The size of the effect was correlated with participants' ratings of their own ego dissolution, suggesting that this

network underlies a stable sense of self [my emphasis].”

Another imaging type, magnetoencephalography (MEG), showed that the rhythm of alpha brainwaves weakened under LSD, an effect that was also correlated with ego dissolution. Alpha rhythms are stronger in humans than other animals, and Carhart-Harris thinks it could be a signature of high-level human consciousness.

<https://www.newscientist.com/article/2083851-first-ld-brain-imaging-study-offers-insights-into-consciousness/?cmpid=NLC|NSNS|2016-1404->

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<http://www.pnas.org/content/early/2016/04/05/1518377113>