



Mini-episode: The Serotonin Addendum
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Music and audio by Jeremy Dahl

Note: This is the script used to create the episode with references added. It has typos. Only the interview is a direct transcript, but the rest sticks pretty close to the writing.

Intro

Welcome to Do We Know Things? A podcast where we examine things we think we know about sex.

Content warning: This podcast will include discussions of serotonin and brains.

Hi everyone! I am Dr. Lisa Dawn Hamilton, professor of psychology and sex educator. Today on Do We Know Things, an addendum on serotonin

On Episode 47 of this podcast, called "[Is Love a Drug?](#)" I talked about the neuroscience of infatuation. If you haven't listened yet, go do that! I will put a link to it in the show notes. On this mini-episode, I wanted to do a brief follow up from the last episode. I will tell you about a theory on the brain systems involved in love, lust, and attachment, and specifically look at the role of serotonin.

In the last episode, I talked about the stress response, the dopamine response, and the serotonin response that our brains and bodies have when we are in a state of infatuation. After the episode, I was unsatisfied with only finding a couple of serotonin studies because I thought serotonin was a major component of the attraction & infatuation process. I decided to dig through some of the original papers when this was first proposed to see what I could find.

In 1998, researcher Helen Fisher proposed a theory that there are three separate systems in mammalian brains for mating and reproduction: one for lust, one for attraction, and one for attachment (Fisher, 1998). Although she proposed these systems in all mammals, her own research mostly talks about how this applies in humans. According to this theory, the lust system is driven by sex steroids, estradiol and testosterone that encourage motivation for sexual behavior. The attraction system is focused on a specific person and is responsible for the feelings of love we experience in the infatuation phase. The theory states that this system is driven by the neurotransmitters dopamine, norepinephrine, and serotonin. The attachment system

I really like the idea of three separate systems that sometimes align and sometimes don't. If they align, it means we feel lust, romantic love, and attachment to the same person. But we can also feel lust for one person, be infatuated with another, and be in an attached, committed relationship with yet another. I will note that in the early versions of this theory, based on other theories of

love at the time, it was explicitly stated that the attraction phase was defined by an inability to feel romantic passion for more than one person at a time (Fisher, 1998; Fisher et al., 2002). I think many people would disagree with that experience.

And there is evidence for most of the things she describes. We know that testosterone and estradiol are involved in sexual motivation and desires, that dopamine and norepinephrine are elevated when we feel attraction, and that oxytocin and vasopressin are involved in bonding. What we know almost nothing about is serotonin! Because I had read about the three systems again and again and again, I had assumed it was supported by evidence, but on further reading, it is clear that several components go beyond the data, especially the serotonin parts.

In the original paper, Fisher states that serotonin levels are higher after sex and might signal satiation. There is no reference for this statement, though. But essentially it indicates that serotonin could lower our drive for sex. Other evidence included is what I discussed in the last episode – that because SSRIs reduce the intrusive thoughts of OCD and SSRIs increase serotonin that low serotonin might be linked to intrusive thoughts in the attraction infatuation phase. Since that paper came out there have only been two studies in humans which I discussed in the last episode, neither of which provided a clear outcome on the link between serotonin and infatuation.

I went through every study I could find that mentioned serotonin and love or attraction, and most of them just led in circles referencing each other, or just stating that low serotonin was involved in romantic love without any reference at all (Zeki, 2007).

So what do we know about serotonin? Well, most of the info comes from animal models, and we can't know if animals are infatuated or just horny. We also don't know about their intrusive thoughts. What we do know is about their observable sexual behavior. This includes behaviors related to soliciting sex – meaning sending signals to a potential mate that they are interested, and actual sex. What we do know from studies of SSRIs on rodents is that it dramatically inhibits sexual behavior, specifically mounting and ejaculation in males and lordosis in females. Lordosis is the position a female rodent gets into to allow penetration. These are the most commonly studied animal sex behaviors. For the solicitation behaviors or behaviors that show interest in having sex, there are much less data. However, the few studies there are, either of SSRIs, which increase serotonin, or drugs that specifically stimulate serotonin receptors these studies do seem to find that more serotonin seems to lead to less sexual interest. But, again, there are not a lot of studies on this (Uphouse, 2014).

So, where does this leave us? For me, I am just surprised that, yet again, something I had thought was a fact is actually only tangentially supported in the research. Clearly, higher levels of serotonin seems to be bad for sexual behavior, orgasm and ejaculation, but we don't really know about how it affects our psychological experience of infatuation. It seems that back in 1998, Helen Fisher hypothesized that it might be related, but the only two studies done since then showed unclear results. Although I said in the last episode that the evidence was unclear, my conclusion from more digging is that it is even more unclear. I hope you enjoyed this nerdy exploration in to the research on serotonin and love.

That's all for this episode. If you have any feedback or peer review of this episode, I am always excited to hear from you. You can send me a voice memo recorded on your phone or just a written email to doweknowthings@gmail.com.

You can find a script for this episode with references and extra info on the website at doweknowthings.com.

Acknowledgements

All music and sounds – Jeremy Dahl – Check him out at palebluedot.ca

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Do We Know Things? is released every second Monday and you can find it anywhere you get your podcasts.

Of course, I would love it if you could subscribe and rate and review the podcast on iTunes. Thanks for listening. I will talk to you next time on Do We Know Things?

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