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Neuroreductionism about Sex and Love

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Abstract

“Neuroreductionism” is the tendency to reduce complex mental phenomena to brain states, confusing correlation for physical causation. In this paper, we illustrate the dangers of this popular neuro-fallacy, by looking at an example drawn from the media: a story about “hypoactive sexual desire disorder” in women. We discuss the role of folk dualism in perpetuating such a confusion, and draw some conclusions about the role of “brain scans” in our understanding of romantic love.

There has been a surge of interest in recent years in the neuroscience of love. By looking at images of people’s brains when they are gazing pictures of their romantic partner, for example, and comparing those against images of the same people looking at pictures of a platonic friend, scientists have begun to fill in the various gaps in our knowledge about “what is going on in our brains” when we’re in love. They are also starting to identify a number of brain chemicals—such as oxytocin, dopamine, and serotonin—that seem to play a role in whether and how we form romantic and other social attachments. For some people, this research is exciting—opening up new frontiers for how we understand some of our most basic human experiences. For others, it’s a little bit unsettling. Doesn’t it suggest that “love”—our most prized and mysterious emotion—is really just a bunch of mindless brain chemicals swirling around in our skulls?

The answer is yes and no. At one level of description, *everything* that we experience, from, yes, falling in love, to, say, getting a stomach ache after eating a burrito, is (at least in principle) explainable in terms of microscopic events playing out between our neurons. But there are many different levels of description—including psychological, social, cultural, and even philosophical—that are just as important if we want to have a more complete understanding of the sorts of things that matter to us in our daily existence.¹ “Brain chemicals” only get us so far.

In fact, this new line of research into the neural correlates of “love” (and other high-level experiences) is contributing to all sorts of conceptual confusions. Another serious problem is the tendency to attribute differences in subjective mental states to differences in brain activity, with a one-way arrow of causation running (invariably) from “brain” to “mind.” An example will show what we mean.

Consider the case of “hypoactive sexual desire disorder,” as discussed in a story by the BBC.² Here is a passage from that story, entitled “Libido problems: ‘brain not mind.’” See if you can spot the problem(s):

In recent years, a diagnosis of “hypoactive sexual desire disorder” (HSDD) in women has become more accepted by science. However, there remains controversy about whether the term can or should be used to describe a lack of sexual desire, which may be caused by a variety of psychological, emotional and physical factors.

The latest study [on the question] highlights differences in mental processing in women who have low sex drives. Its author, Dr. Michael Diamond, said it suggested that HSDD was a genuine physical problem.

He recruited 19 women who had been diagnosed with the condition, and compared their brain responses with those of seven others using a functional magnetic resonance imaging scanner, which can measure levels of activation in different parts of the brain by detecting increased blood flow. The women were asked to watch a screen for half an hour, with everyday television programmes interspersed with erotic videos.

In the seven women who did not have the HSDD diagnosis, increased activity in the insular cortices [areas of the brain involved in processing emotion] could be seen. The same did not happen in the women with HSDD.

Dr. Diamond said: “Us being able to identify physiological changes, to me provides significant evidence that it is a true disorder as opposed to a societal construct.”

Dr. Diamond is seriously mistaken. When he suggests that his experiment provides evidence that HSDD is a “genuine physical problem” he confuses correlation for causation. As we noted earlier, in a very basic and almost trivial sense, *every* mental state has a physical explanation: mental events do not occur independently from the brain. To think otherwise would be to subscribe to some kind of naïve Cartesian dualism, according to which our “minds” are made of spirit-stuff, floating around in the vicinity of our heads. On a physicalist theory of the world, on the other hand, it would be impossible for the brains of two women experiencing different mental states (such as sexual desires, but also thoughts, motivations, sensations or any other mental states) to be exactly alike. The important point is that these differences in brain activity tell us exactly nothing about what actually *caused* the differences in brain activity.

To put it another way: the brains of women with low sex drives must be different to the brains of women with high sex drives, because they have different sex drives! Similarly, if John is bored and Mary is not, their brains will have different activity. If we had a high enough resolution scanner to record their brain activity, we would see that the bored brain, compared to the not-bored brain, showed a different physical signature. But this does not show that boredom is a “true disorder” or a “social construct” or anything else.³

The very title of BBC story about Dr. Diamond and his research—“*Libido problems: brain, not mind*”—illustrates this folk confusion. Such an expedition into false explanation is

“neuroreductionism” plain and simple, and it’s something to look out for when reading science articles in the media.

Of course, this doesn’t mean that brain-causation isn’t real or that we can’t ever detect it. Brain changes *can* genuinely cause other changes in the brain and with those latter changes, changes in the mind. For example, a brain tumour may cause an increase in paedophilic sexual desire, as happened in the infamous case of a 40-year-old schoolteacher.⁴ This is a real (and indeed rare) case of “paedophilia: brain, not mind.” But in virtually all cases of complex sexual behavior—or any other complex mental phenomenon—we have very little idea about the actual causal chain involved. At best, we’ll have just a few steps along the way.

Speaking generally, what it is that causes brain-level differences between people with different mental states or experiences could be genetic, neurochemical, environmental, social—or some combination of “all of the above.” The only way to figure out *causation* is to run an experiment, where you actually change or manipulate one of those variables (in one group of people) and compare their resulting brain activity to a similar group of people who’ve been left alone—keeping everything else the same.

In some of our own recent work, for example,⁵⁶⁷ we have written about the possibility of administering synthetic “love drugs” to couples undergoing counseling, actually intervening at the level of the brain in an attempt to “enhance” the couple’s mental states, including their subjective experiences of being in love. But then, the couple could “enhance” their own mental states behaviorally—by having sex, for example—which would trigger the release of “natural” love drugs like oxytocin created by brain. This just goes to show that there are many different ways to effect changes in the brain, some of which might be indistinguishable from each other in terms of what would show up on a brain scan.

Don’t get us wrong: we don’t have anything against brain scans. We just care about how they’re interpreted, not only by scientists, but also by journalists and by members of the public at large. For whatever the brain-level correlates of love or lust can teach us, they will always be lacking for a causal explanation. And unless we are talking about a freak occurrence of tumour-induced paedophilia (or other similar occurrence), they’ll have very little to say as well about whether our sexual or relationship problems are “in our brains” as opposed to “in our minds.”⁸

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Notes

1. It’s also worth noting, as Neil Levy pointed out to us (personal correspondence) that “many non-reductive physicalists, while certainly agreeing with this claim, also assert a stronger claim: something like ‘though mental states are completely caused by physical states they are not identical

to physical states.’ So it’s not just pragmatics – what kind of explanation allows for better understanding of what matters to us – but metaphysics that is at issue” for *these* kinds of physicalist thinkers.

2. See story at <http://bbc.in/a4CHXf>
3. Now, Dr. Diamond’s evidence *might* show that the women are not “faking” their low libido, which could be one sense in which you could argue that they had a “real disorder.” But it is silent on etiology—the question of cause—and it depends very much on one’s definition of “disorder.” For example, it might be a real disorder that is also a “societal construct.” That is, some self-conceptions are shaped by notions that are available in a given culture (but not others), and these conceptions can influence one’s functioning in ways that are detrimental to their well-being in that context. The Diagnostic and Statistical Manual of Mental Disorders from the American Psychiatric Association, for example, recognizes a number of “culture-bound” disorders.
4. See story at <http://www.newscientist.com/article/dn2943-brain-tumour-causes-uncontrollable-paedophilia.html#.U3EBgF5H1fM>
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6. Wudarczyk OA, Earp BD, Guastella A, Savulescu J. Could intranasal oxytocin be used to enhance relationships? Research imperatives, clinical policy, and ethical considerations. *Current Opinion in Psychiatry*. 2013; Vol. 26(No. 5):474–484. [PubMed: 23880593]
7. Earp BD, Sandberg A, Savulescu J. The medicalization of love. *Cambridge Quarterly of Healthcare Ethics*. (forthcoming).
8. See <http://blog.practicaethics.ox.ac.uk/2010/10/is-low-libido-a-brain-disorder/> Some of the material in this paper has been adapted from a blog post by the first author for the *Practical Ethics* blog at the University of Oxford.