Module 3: “Love”
Complete by Thursday, February 18

Take a brief moment to imagine how different your day-to-day experience might be if you lived in a world with no family members, no friends, no peers, no romantic partners.

It’s easy to take our conceptions of social reality for granted—feelings we have towards others, connections we form with them, cultural norms regarding our interactions with them, and the structure and function of our societies. Not only do we experience this social reality on a daily basis, but in many regards the human brain has evolved to process social information in very specific ways that are inherently part of this reality, making it harder to imagine things being different. Nonetheless, this will be precisely our goal and our challenge for this module. We will attempt to shed our assumptions and ask why things are the way they are.

One way to study human social behavior—and any aspect of our biology—is to turn to everything that isn’t human. Social life in the animal kingdom is phenomenally diverse, ranging from solitary animals like octopi to highly social animals that form complex societies, like bees and naked mole rats. This diversity is exciting for scientists interested in social behavior, because it allows us to compare species with similar or different behaviors, look for similarities or differences in their biology and/or ecology, and pinpoint the factors or systems that contribute to those behaviors. This is called a comparative approach. Not only has the comparative approach deepened our understanding of our own biology and behavior, but it has helped identify factors that can improve our experience as humans (e.g. environmental risk factors and/or therapeutic targets for devastating genetic and/or psychiatric conditions).

My work as a neuroscientist is rooted in the application of the comparative approach to mating strategies surrounding reproduction. Without reproduction, life stops, making reproductive behavior one of the most universal, fundamental, and deeply studied categories of behavior in the animal kingdom. Despite its pervasiveness, there are many different systems that have evolved across species to accomplish the goal of reproducing (how many different systems do you count here? I think they missed one…look at this). These systems can often be characterized by unique sets of behaviors.

Monogamy, or a socially and/or reproductively exclusive relationship between two mates, is one of these mating systems, and it is of particular interest to us. Scientists are still in heated debate about how to classify human mating behavior, but they generally agree that we seem to have some kind of capacity for monogamous behavior; enduring, exclusive social and sexual pairing between humans is not uncommon. There are many cultural practices, religious doctrines, and legal policies surrounding monogamous interaction, which further shape our perspectives on this behavior. From a neuroscience perspective, the brain circuits that are involved in bonding with a mating partner are deeply intertwined with the circuits involved in processing other forms of social information, forming other kinds of social attachments (e.g. mother-offspring bonding), and processing information in more general contexts such as reward learning, motivation, and memory. In other words, understanding the neural basis of monogamous behavior and how it evolved can provide important insights into understanding the structure and function of the human brain and mind.
For class discussion:

1. In the previous module, we learned about forms of metadata and how they can be used to collect information about us. Do you think metadata can be used to understand individual human social behavior and relationships? A group at the MIT Media Lab invented an algorithm called “Immersion” that collects “From, To, Cc, and Timestamp” (not content) information from your e-mail account and uses it to model your social network from it. You have the option of deleting this information permanently afterwards (really deleting it!). You can try it here.

   Does your Immersion social network look accurate? Adjust the time frame bar at the bottom of the page. Do you find anything interesting? Can you find evidence of formation of new relationships, or fizzling out of old relationships? What questions about human social behavior can be investigated using metadata?

2. In 2013, two interesting comparative studies on the evolution of mammalian monogamy were published and made a splash in the media. Here are two articles covering them:


   What did the two teams find, and what might be possible reasons for the differences?

3. Classification of human mating behavior is difficult, and is still a heated debate among scientists. Would you classify human sexual behavior as monogamous? Find an abstract for one interesting scientific journal publication related to monogamy (human or non-human) that you find interesting using Google Scholar and/or PubMed. When was the article published? What journal was it published in? What did you find interesting about it?

   Bring a printed copy of the abstract to class and be ready to discuss.

There will be a short “quiz” at the beginning of class. The quiz will not be designed to stump you, but instead will be designed to determine if you actually completed the above exercises.