

From group pressure to personal choice: The prefrontal circuits of social influence on individual reward preference

We live in a world where our decisions are increasingly shaped by the people around us. Whether it is the political views we adopt, the products we buy, or the lifestyles we aspire to, we are rarely as independent as we think. Social influence, the pressure to align our preferences with others, affects our behavior more deeply and more often than we tend to admit. And it does not always take the form of overt persuasion. Often, the simple presence of others or our need to belong is enough to sway our choices. From a scientific point of view, this makes social influence one of the most powerful forces guiding human decision-making.

But what exactly happens in the brain when we follow the lead of others? What determines whether we stick to our own preferences or let ourselves be swayed by social factors? While psychology has long described the effects of peer pressure and group conformity, we still know very little about the precise brain mechanisms behind them. That is the gap this project aims to fill.

Studying this in humans is not easy. Brain research at this level requires experimental control that is often impossible and unethical to perform in human subjects. That is why we turn to mice, a species with surprisingly rich social lives, whose brains share many fundamental structures and functions with ours. Mice form social groups, compete and cooperate, and change their behavior depending on what others do. Like us, they can develop and modify reward preferences based on social information. This makes them an ideal model to study how individual preferences are shaped and sometimes reshaped under the influence of others.

To track these behaviors, we will use Eco-HAB, a system developed in the course of our research that allows mice to live and interact in a space designed to mimic their natural environment. Eco-HAB lets us observe voluntary social interactions and track individual choices with no need for human interference. This creates a unique opportunity: we can study natural behavior with scientific precision. In this project, we will use Eco-HAB to monitor how mice form and change preferences based on social factors, for example, by seeing if they conform to the majority or high-status individuals.

But behavior is only part of the story. To understand how these changes in preferences happen, we need to look into the brain. Our focus is the prefrontal cortex (PFC), a brain region known to be crucial for processing both rewards and social information. We will investigate how specific groups of nerve cells (neurons) in this area contribute to the way animals respond to social influence. Using innovative brain regulation techniques, such as optogenetics and chemogenetics, we will be able to artificially turn these neurons on or off in freely moving animals. This will let us test how manipulating brain activity in real time affects the strength of social impact on preference and decision-making, both in the short term and over longer timescales.

To make sense of the vast data this approach generates, we will also develop new computational tools. Working with mathematicians from ETH Zurich, we will create models that help us understand how patterns of social influence emerge and stabilize over time. These models will be designed not only to analyze behavior but to predict how social context, including past interactions, changes what an individual is likely to do next. Ultimately, this may help identify why some individuals are more susceptible to influence than others.

We argue that in times of increasing polarization, from fake news to targeted advertising, understanding how and why we change our minds under social pressure is more than a theoretical question. It speaks to the very heart of autonomy and choice. By combining state-of-the-art neuroscience, innovative behavioral tools, and computational modeling, this project seeks to uncover the building blocks of one of the most familiar yet elusive forces in our lives: the influence of others.