

Bound by attention: Bringing rats and humans together

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When picking through a basket of fruit, it doesn't seem very difficult to recognize a green pear from a green apple. This is easy, thanks to "feature binding"—a process by which our brain combines all of the specific features of an object and gives us a complete and unified picture of it.

For example, upon first seeing the fruit basket, our brain immediately gets to work, connecting (or binding) information about each fruit's shape to its color to ensure that we select the green apple we are craving instead of a green pear. However, if our brain gets distracted, our ability for feature binding is reduced and we may inadvertently end up biting into the green pear instead. It was well known which areas of the brain are involved in feature binding, but it was unclear which neurotransmitters (or brain chemicals) contribute to this important process.

Psychologists Leigh C.P. Botly and Eve De Rosa from the University of Toronto wanted to investigate if acetylcholine is involved in feature binding. Acetylcholine is a neurotransmitter that is important for attention and seemed like a good candidate for playing a role in feature binding as well. A group of volunteers participated in a feature binding task (choosing among various shapes and colors), with some of them being distracted throughout the duration of the task. The psychologists also developed a feature binding task for rats (having them choose among variously scented food bowls) and treated some of the animals with the drug scopolamine, which temporarily blocks the effects of

acetylcholine.

The results, reported in the November issue of *Psychological Science*, a journal of the Association for Psychological Science, showed that patterns of behavior were very similar in distracted humans and rats on scopolamine. Both the drug treated rats and distracted humans had a decreased ability to complete the feature binding task (which required the ability to combine many different features of an object together) although their ability to process just single features of an object (e.g. one specific color or odor) was not affected. In other words, blocking the rats' cholinergic system (by using scopolamine) made them behave similarly to distracted humans, suggesting that the neurotransmitter acetylcholine is necessary for feature binding to occur. The authors note that "acetylcholine may provide the attentional 'glue' for feature binding."

Their findings have important clinical implications, as the development of a better animal model of distraction and inattention may lead to improved therapies and treatments for a variety of disorders, such as Alzheimer's disease.

Source: Association for Psychological Science

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