Research Award Brief


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**Research Question:** How do we learn to ignore irrelevant information?

**Interdisciplinary Approach:** We will use behavioral & electrophysiological techniques to explore the neural mechanisms underlying the ability to ignore in typically developing and clinical populations.

**Potential Implications of Research:** The results will inform theories of attention and learning as well as interventions designed to help persons with ADHD cope with distraction.

We live in a vast sea of information. As our information processing capacity is limited, one of life’s most critical tasks is selectively responding to the stimuli that are the most relevant to our current goals. Research on behavioral selectivity is perhaps more important now than ever before, as technology has made the presence of multiple threads of information ubiquitous. Selecting the most relevant bits of information from the constant flood is a challenge both for consumers and providers of information. To tackle this problem, we must understand how humans ignore irrelevant information.

To date, the bulk of both experimental and theoretical research have explored how we focus attention, with little exploration into how we learn to ignore irrelevant information. Attending and ignoring are distinguishable processes, and learning may affect them independently. Preliminary research suggests that learning what not to do can be just as important as learning what to do. Indeed, what not to attend to—what to ignore—can be even more important when it comes to saving time and effort, and avoiding confusion. Like many other forms of cognitive control, ignoring is a skill. It varies across individuals, it becomes easier with practice, and it can be trained.

There are several kinds of mechanisms that could impact our ability to ignore stimuli. It might be that individuals can suppress sensory processing of irrelevant material. We obtained evidence of just such an early locus of ignoring in an electrophysiological study in which participants paid attention to stimuli of one color while ignoring stimuli of another color on a computer screen (see figure). Another kind of mechanism comes into play later in the information-processing stream. For example, when participants are searching for the one shape in a display that is different from surrounding shapes, performance is badly disrupted by the presence of a shape in a different color in the display. Although responses may be delayed, participants eventually make the right response. Ignoring in this case requires disengaging attention from the stimulus that initially drew attention to itself, and suppressing any response tendencies engendered during that initial misdirection of attention. We will investigate both early and late forms of ignoring to elucidate how they are affected by learning, and how training may transfer to new situations.

As skill at ignoring varies across individuals, it is important to explore the effects of learning at several different levels of ability. Anecdotally, individuals with attention-deficit hyperactivity disorder (ADHD) are thought to be susceptible to distraction. Using both behavioral responses and neural responses, we hope to learn which specific deficits in ignoring are present in individuals with ADHD, with the ultimate hope that training can be developed to bolster these abilities in affected individuals.

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