

## Cognitive neuroscience of ADHD

### Abstract

Jon Fine Z"l aimed to link cognitive processes to meaning-making and language in the speech community through dynamic analysis of normal and abnormal language and their ideational, interpersonal and textual meanings. In line with his vision, this presentation examines the neural mechanisms underlying cognitive processes involved in one of the disorders that interested Jon. Attention deficit hyperactivity disorder (ADHD) is one of the most common, persistent and impairing of childhood maladies. Rather than focus on language, this work addresses the contribution of executive function to goal-directed behavior. Parsing ADHD with cognitive methods affords new insight into the neurobiology of the disorder and provides a template for the study of other complex disorders. Specifically, the lecture will cover four cardinal features of ADHD that demand a cognitive neurosciences approach (ADHD is a quantitative trait, is highly heterogeneous, is strongly linked to genetic risks and is typified by a wide range of individual executive control deficits). Rather than a segmented approach to the study of executive control, we use a particular cognitive "probe", the stop signal task, to study ADHD. Designed as a measure of response inhibition, the ability to cancel an ongoing response when goals or circumstances change, the stop-signal task affords a window on the dynamic, re-entrant, and rapidly unfolding cognitive and neurophysiological processes involved in executive control in health and disease. These processes involve preparation, inhibition, error detection and post-error adjustment. As will be described, the stop-signal task informs the cognitive, neurophysiological and genetic heterogeneity of ADHD.

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