

Go/No-Go task

The Go/No-Go [task](#) is a widely used [psychological test](#) that assesses an individual's [ability](#) to perform an [action](#) (Go) or to inhibit an action (No-Go). It is commonly employed in cognitive neuroscience, psychology, and behavioral studies to evaluate aspects of executive function, impulse control, and decision-making. Here's an overview of the task and its applications:

Overview of the Go/No-Go Task Task Structure:

Participants are presented with stimuli (usually visual or auditory) that signal whether they should respond (Go) or refrain from responding (No-Go). For example, they may be instructed to press a button when a specific symbol appears (Go) but not to press the button when a different symbol appears (No-Go). Response Types:

Go Trials: Participants are required to react quickly by performing a specific action, such as pressing a key. No-Go Trials: Participants must inhibit their response, meaning they should refrain from performing the action when a certain cue is presented. Measurement:

The task is designed to measure reaction times, accuracy, and the number of errors made (false alarms during No-Go trials). Reaction times for Go trials are often compared to No-Go trials to assess impulse control and decision-making processes. Cognitive and Neuropsychological Implications
Executive Function: The Go/No-Go task is used to evaluate executive functions, particularly the ability to control impulses and manage competing responses. It helps researchers understand how individuals prioritize responses and inhibit inappropriate actions.

Neurological Research: This task is frequently utilized in studies involving brain functions, especially in conditions like ADHD, substance abuse, and neurological disorders. Differences in performance can highlight dysfunctions in specific brain regions, such as the prefrontal cortex and basal ganglia, which are critical for decision-making and impulse control.

Clinical Applications: It can help in assessing cognitive impairments in various populations, including individuals with Parkinson's disease, schizophrenia, and anxiety disorders. Performance on the task can inform treatment approaches and the development of therapeutic interventions.

Variants and Adaptations The Go/No-Go task has several adaptations, including variations in the complexity of stimuli, the timing of presentations, and the introduction of different contextual cues. These modifications can be used to examine specific cognitive processes or to adapt the task for particular populations.

Conclusion The Go/No-Go task is a fundamental tool in psychological and neuroscience research. It provides valuable insights into cognitive control, decision-making processes, and the neurophysiological mechanisms underlying impulse control. By analyzing performance on this task, researchers can gain a deeper understanding of both normal and abnormal cognitive functions, contributing to advancements in psychological assessment and treatment strategies.

Wang et al. recorded from deep brain stimulation subthalamic [electrodes](#) time-locked with acute stimulation using a [Go/Nogo task](#) to assess voluntary action and inaction. Beta oscillations during voluntary decision-making were temporally dissociated from motor function. Parkinson's patients

showed an inaction bias with high beta and intermediate physiological states. Stimulation reversed the inaction bias highlighting its causal nature, and shifting physiology closer to reactive choices. Depression was associated with higher alpha during Voluntary-Nogo characterized by inaction or inertial status quo maintenance whereas apathy had higher beta-gamma during voluntary action or impaired effortful initiation of action. The findings suggest the human subthalamic nucleus causally contributes to voluntary decision-making, possibly through threshold gating or toggling mechanisms, with stimulation shifting towards voluntary action, and suggest biomarkers as potential clinical predictors ¹⁾

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Wang Y, Wang L, Manssuer L, Zhao YJ, Ding Q, Pan Y, Huang P, Li D, Voon V. Subthalamic stimulation causally modulates human voluntary decision-making to stay or go. NPJ Parkinsons Dis. 2024 Nov 2;10(1):210. doi: 10.1038/s41531-024-00807-x. PMID: 39488535.

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