# UC Merced

## Proceedings of the Annual Meeting of the Cognitive Science Society

### Title

Choosing to choose: Neural Mechanisms Underpinning Levels of Volition

### Permalink

https://escholarship.org/uc/item/0xx451wk

### Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 47(0)

### Authors

Bundil, Indra M
Baltruschat, Sabina
Zhang, Jiaxiang

### Publication Date

2025

### Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at https://creativecommons.org/licenses/by/4.0/

Peer reviewed

eScholarship.org Powered by the California Digital Library
University of California

# Choosing to choose: Neural Mechanisms Underpinning Levels of Volition

**Indra Bundil**
Cardiff University, Cardiff, United Kingdom

**Sabina Baltruschat**
N/A, N/A, United Kingdom

**Jiaxiang Zhang**
Swansea University, Swansea, United Kingdom

**Abstract**

Voluntary action entails decision-making guided by endogenous intentions, yet the neural correlates of varying levels of volitional freedom remain underexplored. This fMRI study examined 39 participants performing a task with three conditions: (1) cued Go/NoGo, (2) 2-choice Go (left/right), and (3) 3-choice Go/NoGo (left, right, or NoGo). Behaviorally, reaction times increased with greater volitional freedom, indicating higher cognitive demands. BOLD analyses showed dlPFC activation for choices (2-choice Go > cued Go), supporting its role in higher-order cognition. Greater volitional freedom (3-choice Go > 2-choice or cued) further engaged the right insula and SMA, the latter likely reflecting the sequencing of decisions about whether to act and, if so, which action to select. The left insula was activated across all choice conditions relative to cued. These results advance our understanding of voluntary decision-making by showing distinct neural activation patterns underlying varying levels of volitional freedom.



In D. Barner, N.R. Bramley, A. Ruggeri and C.M. Walker (Eds.), *Proceedings of the 47th Annual Conference of the Cognitive Science Society* ©2025 the author(s). This work is licensed under a Creative Commons Attribution 4.0 International License (CC BY).