



## SEMINARIO PRESENCIAL

Jueves, 14 de Diciembre de 2023  
12:30 h. Instituto Cajal - CSIC

**DR. IGNACIO OBESO**

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[www.controlandhabit.com](http://www.controlandhabit.com)

# ORGANIZED BEHAVIOUR: NEURAL BASIS OF CONTROL AND HABITS

## Abstract

Organized and habits require sufficient repetition of similar contextual information to consolidate our behaviours. This is accomplished by a refined combination of cognitive control, expected rewards, stimulus-response associations and action selection. The ability to select the best possible movement, thoughts or emotions may largely rely on fast and anatomically precise subdivisions along the cortico-striatal and hippocampal networks. Yet, little is known about how controlling and learning systems interact to reach organized and habitual behaviours, their underlying neural substrates and when they fail in certain pathologies. During my talk, I will provide evidence on how cognitive control, actions and inhibition can be trained, in a series of experiments where everyday life and experimental measures are combined in both healthy and disease conditions. Using behavioural paradigms, neuroimaging, brain stimulation and patients, my talk will combine concepts of habit and control of organized behaviour with putative altered mechanisms in some neuropsychiatric conditions, where loss of control over particular reward cues is evident.

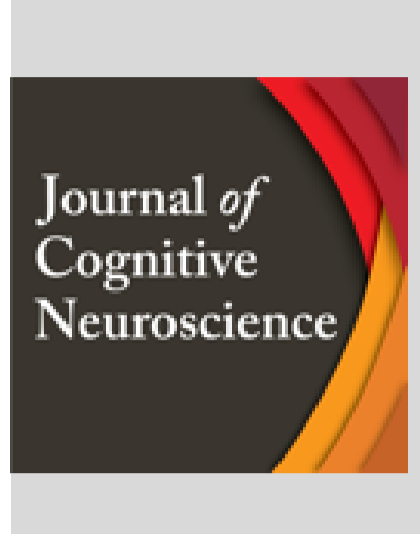

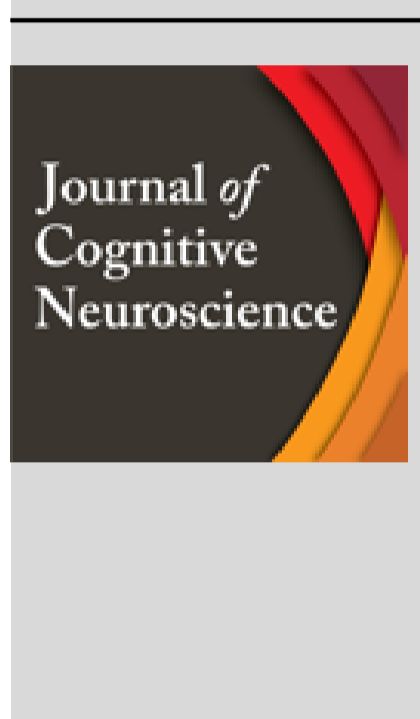

## Affiliation and short bio

After completing a Psychology degree (University of Deusto), Dr. Ignacio Obeso began a PhD in cognitive neuroscience (UCL, London, UK). He carried out a series of behavioural and neuromodulatory experiments to provide novel evidence on the causal role of subcortical (the subthalamic nucleus) and cortical (pre-SMA) in cognitive control during selection of actions, inhibition and conflict resolution (in healthy and Parkinson's disease patients). Following 2 postdoctoral periods (University of Toronto, Canada and CNRS, France), he demonstrated the causal circuitry behind cognitive control and social decision making, and how this applies to neuropsychiatric conditions, such as impulse control disorders. The use of neuroimaging and computational techniques combined with neuromodulation has led him to delineate the cortico-subcortical interactions during healthy behaviour, showing a leadership role in the field with the generation of opinion letters (*Brain Stimulation, Cerebellum or Movement disorders*) and organization of international symposiums. In 2019, he opened the [Cognitive Control and Habit laboratory](#) focused on normal and alterations in cognitive control and habitual behaviour (Complutense University and HM-CINAC, Madrid, Spain). In his lab, the aim is to decipher the cognitive computations, neural basis and neuromodulation of cognitive control in healthy samples to translate into pathological conditions whereby behaviour is marked by uncontrolled processes.

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## Related publications with the topic

	<p>D Mata-Marín, P Redgrave, <b>I Obeso</b>. The Impact of Emotions on Habitual Inhibition. <i>Journal of Cognitive Neuroscience</i>, 1-11; 2023. <a href="https://doi.org/10.1162/jocn_a_02050">https://doi.org/10.1162/jocn_a_02050</a></p>	<p><i>We reveal novel means to capture human cognitive habits and the influence of emotions. An impact of emotions is seen when cognitive habit (inhibitory one) was stronger.</i></p>
	<p>David Mata-Marín, José Ángel Pineda-Pardo, Mario Michiels, Cristina Pagge, ... <b>Ignacio Obeso</b>. A circuit-based approach to modulate hypersexuality in Parkinson's disease. <i>Psychiatry &amp; Clinical Neuroscience</i>. 77, 223–232, 2023. <a href="https://doi.org/10.1111/pcn.13523">https://doi.org/10.1111/pcn.13523</a>.</p>	<p><i>We demonstrate how (reactive) inhibition of actions is impaired in hypersexual behaviours when faced with erotic cues, linked to a cortico-limbic disconnection. Brain stimulation reverted the disconnected cortical area and improved inhibitory control.</i></p>
	<p>Guida P, Foffani G, <b>Obeso I</b>. The supplementary motor area and automatic cognitive control: lack of evidence from two neuromodulation techniques. <i>J Cognitive Neurosci</i>. 35 (3), 439-451, 2023. <a href="https://doi.org/10.1162/jocn_a_01954">https://doi.org/10.1162/jocn_a_01954</a></p>	<p><i>We show compelling evidence to reject a dominant role of the SMA in stopping automatic responses (using two different inhibitory neuromodulation techniques).</i></p>
	<p>Guida P, Michiels M, Redgrave P, Luque D, <b>Obeso I</b>. An fMRI meta-analysis of the role of the striatum in everyday-life vs laboratory-developed habits. <i>Neurosci Biobehav Rev</i>. 2022. Oct;141:104826. <a href="https://doi.org/10.1016/j.neubiorev.2022.104826">https://doi.org/10.1016/j.neubiorev.2022.104826</a></p>	<p><i>Studies using everyday-life and experimental habits show a coincidental activity in anterior and posterior putamen. Motor and cognitive habits showed common representation in posterior putamen, representing a novel comparison of different ways to study habits in humans.</i></p>