Forskningskonferanse Helgelandssykehuset 6-7 okt. 2021

Kjønnsbalanse og likestilling i akademia

Elektrofysiologiske data gir økt kunnskap om hjernens kognitive kontrollfunksjoner

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UiO : University of Oslo | FRONT neurolab | RITMO | Oslo University Hospital | HELGELANDSSYKEHUSET HELGELAANTEN SKÏEMTJEGÅETIE

Publiserte artikler 2021 (* = nivå 2 tidsskrift)

*Kam, J. W. Y., Helfrich, R. H., Lin, J. J., **Solbakk, A. K.**, Endestad, T., Larsson, P., & Knight, R. T. (2021). Top-down attentional modulation in human frontal cortex: Differential engagement during external and internal attention. *Cerebral Cortex*, *31*(2), 873-883.

*Buades-Rotger, M., **Solbakk, A. K.**, Liebrand, M., Endestad, T., Funderud, I., Siegwardt, P., Enter, D., Roelofs, K., & Krämer, U. M. (2021). Patients with ventromedial prefrontal lesions show an implicit approach bias to angry faces. *Journal of Cognitive Neuroscience*, *33*(6), 1069–1081.

Hatlestad-Hall, C., Bruña, R., Erichsen, A., Andersson, V., Syvertsen, M. R., Skogan, A. H., Renvall, H., Marra, C., Maestú, F., Heuser, K., Taubøll, E., **Solbakk, A. K.**, & Haraldsen, I. H. (2021). The organization of functional neurocognitive networks in focal epilepsy correlates with domain-specific cognitive performance. *Journal of Neuroscience Research*. Advance online publication.

*Llorens, A., Tzovara, A., Bellier, L., Bhaya-Grossman, I., Bidet-Caulet, A., Chang, W. K., Cross, Z. R., Dominguez-Faus, R., Flinker, A., Fonken, Y., Gorenstein, M. A., Holdgraf, C., Hoy, C. W., Ivanova, M. V., Jimenez, R. T., Jun, S., Kam, J., Kidd, C., Marcelle, E., Marciano, D., Martin, S., Myers, N. E., Ojala, K., Pinheiro-Chagas, P., Ries, S., Perry, A., Saez, I., Skelin, I., Slama, K., Staveland, B., Bassett, D. S., Buffalo, E. A., Fairhall, A. L., Kastner, A., Kopell, N. J., Lin, J. J., Nobre, A. C., **Solbakk, A. K.**, Wallis, J. D., Wang, X. J., Yuval-Greenberg, S., Knight, R. T., & Dronkers, N. F. (2021). Gender bias in academia: A lifetime problem that needs solutions. *Neuron*, *109*(13), 2047–2074.

*Levine, B., Rosenbaum, R. S., **Solbakk, A. K.**, & D'Esposito, M. (2021). Introduction to the special issue. *Journal of Cognitive Neuroscience*, *33*(9), 1635.

*Liebrand, M., **Solbakk, A. K.**, Funderud, I., Buades-Rotger, M., Knight, R. T., & Krämer, U. M. (2021). Intact proactive motor inhibition after unilateral prefrontal cortex or basal ganglia lesions. *Journal of Cognitive Neuroscience*, *33*(9), 1862–1879.

*Slama, S., Jimenez, R., Saha, S., King-Stephens, D., Laxer, K. D., Weber, P. B., Endestad, T., Ivanovic, J., Larsson, P. G., **Solbakk, A. K.**, Lin, J. J., & Knight, R. T. (2021). Intracranial recordings demonstrate both cortical and medial temporal lobe engagement in visual search in humans. *Journal of Cognitive Neuroscience*, *33*(9), 1833–1861.

***Solbakk, A. K.**, Lubell, J., Leske, S., Funderud, I., Llorens, A., Blenkmann, A. O., Foldal, M. D., Meling, T. R., Knight, R. T., & Endestad, T. (2021). Monitoring of self-paced action timing and sensory outcomes after lesions to the orbitofrontal cortex. *Journal of Cognitive Neuroscience*, *33*(9), 1956–1975.

Neuron

CellPress

Perspective

Gender bias in academia: A lifetime problem that needs solutions

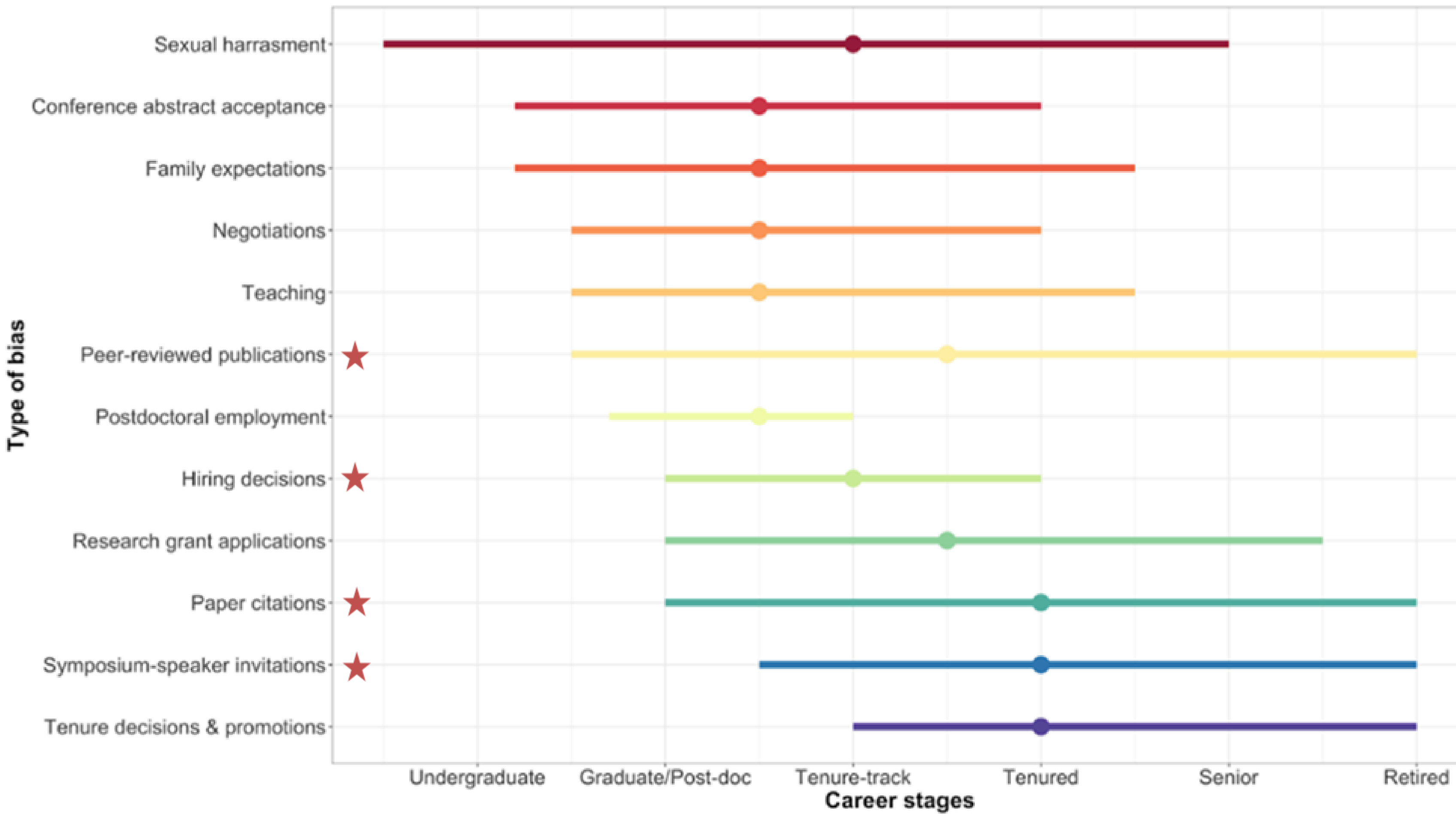
Anaïs Llorens,[1,39,*] Athina Tzovara,[1,2,3,39,*] Ludovic Bellier,[1,40] Ilina Bhaya-Grossman,[4,40] Aurélie Bidet-Caulet,[5,40] William K. Chang,[1,40] Zachariah R. Cross,[6,40] Rosa Dominguez-Faus,[7,40] Adeen Flinker,[8,40] Yvonne Fonken,[1,9,40] Mark A. Gorenstein,[1,10,40] Chris Holdgraf,[1,11,40] Colin W. Hoy,[1,40] Maria V. Ivanova,[10,40] Richard T. Jimenez,[1,40] Soyeon Jun,[1,12,40] Julia W.Y. Kam,[1,13,40] Celeste Kidd,[10,40] Enitan Marcelle,[1,40] Deborah Marciano,[1,14,40] Stephanie Martin,[1,15,40] Nicholas E. Myers,[1,16,40] Karita Ojala,[17,40] Anat Perry,[18,40] Pedro Pinheiro-Chagas,[19,40] Stephanie K. Riès,[20,40] Ignacio Saez,[21,40] Ivan Skelin,[22,40] Katarina Slama,[1,40] Brooke Staveland,[1,14,40] Danielle S. Bassett,[23,24,41] Elizabeth A. Buffalo,[25,41] Adrienne L. Fairhall,[26,41] Nancy J. Kopell,[27,41] Laura J. Kray,[14,41] Jack J. Lin,[28,29,41] Anna C. Nobre,[16,41] Dylan Riley,[30,41] Anne-Kristin Solbakk,[31,32,33,34,41] Joni D. Wallis,[1,10,41] Xiao-Jing Wang,[35,41] Shlomit Yuval-Greenberg,[36,41] Sabine Kastner,[37,41,42] Robert T. Knight,[1,10,41,42] and Nina F. Dronkers[10,38,41,42]

Anais Llorens,
UiO/UC Berkeley

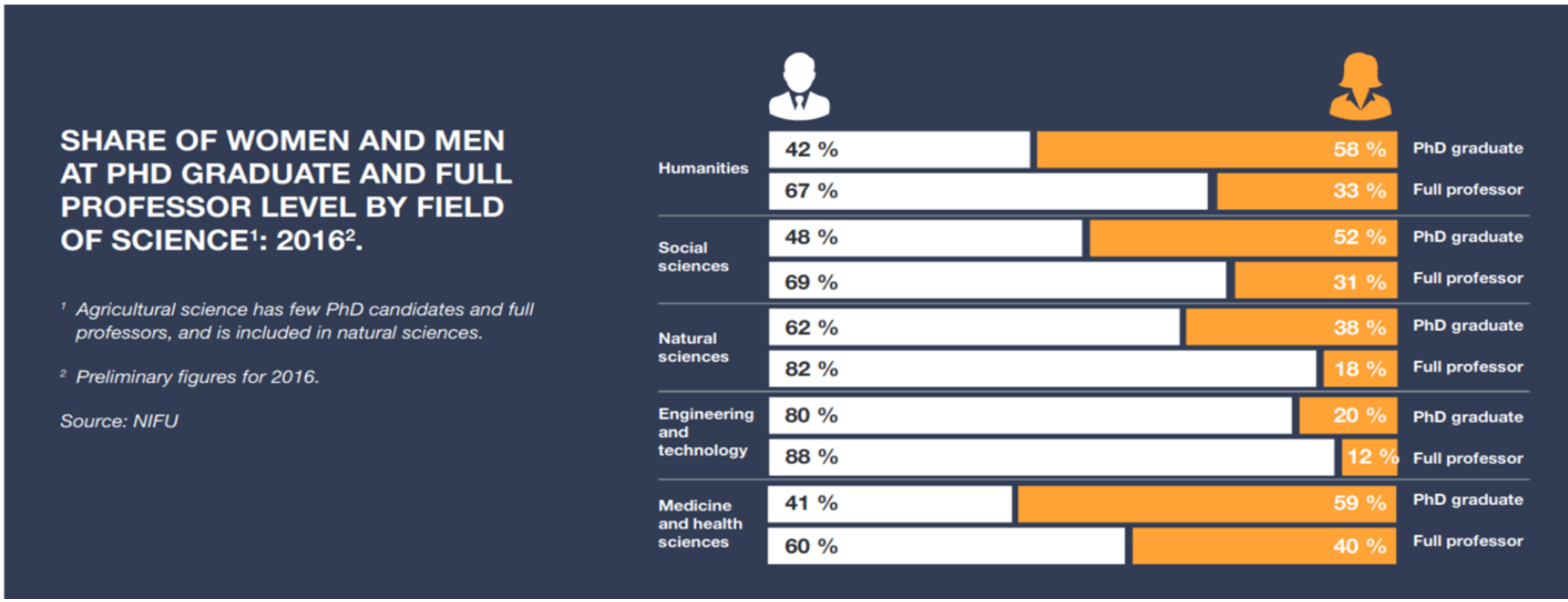
SUMMARY

Despite increased awareness of the lack of gender equity in academia and a growing number of initiatives to address issues of diversity, change is slow, and inequalities remain. A major source of inequity is gender bias, which has a substantial negative impact on the careers, work-life balance, and mental health of underrepresented groups in science. Here, we argue that gender bias is not a single problem but manifests as a collection of distinct issues that impact researchers' lives. We disentangle these facets and propose concrete solutions that can be adopted by individuals, academic institutions, and society.

Aspekter av kjønnsskjevhet (gender bias) gjennom kvinnelige forskeres karriereløp



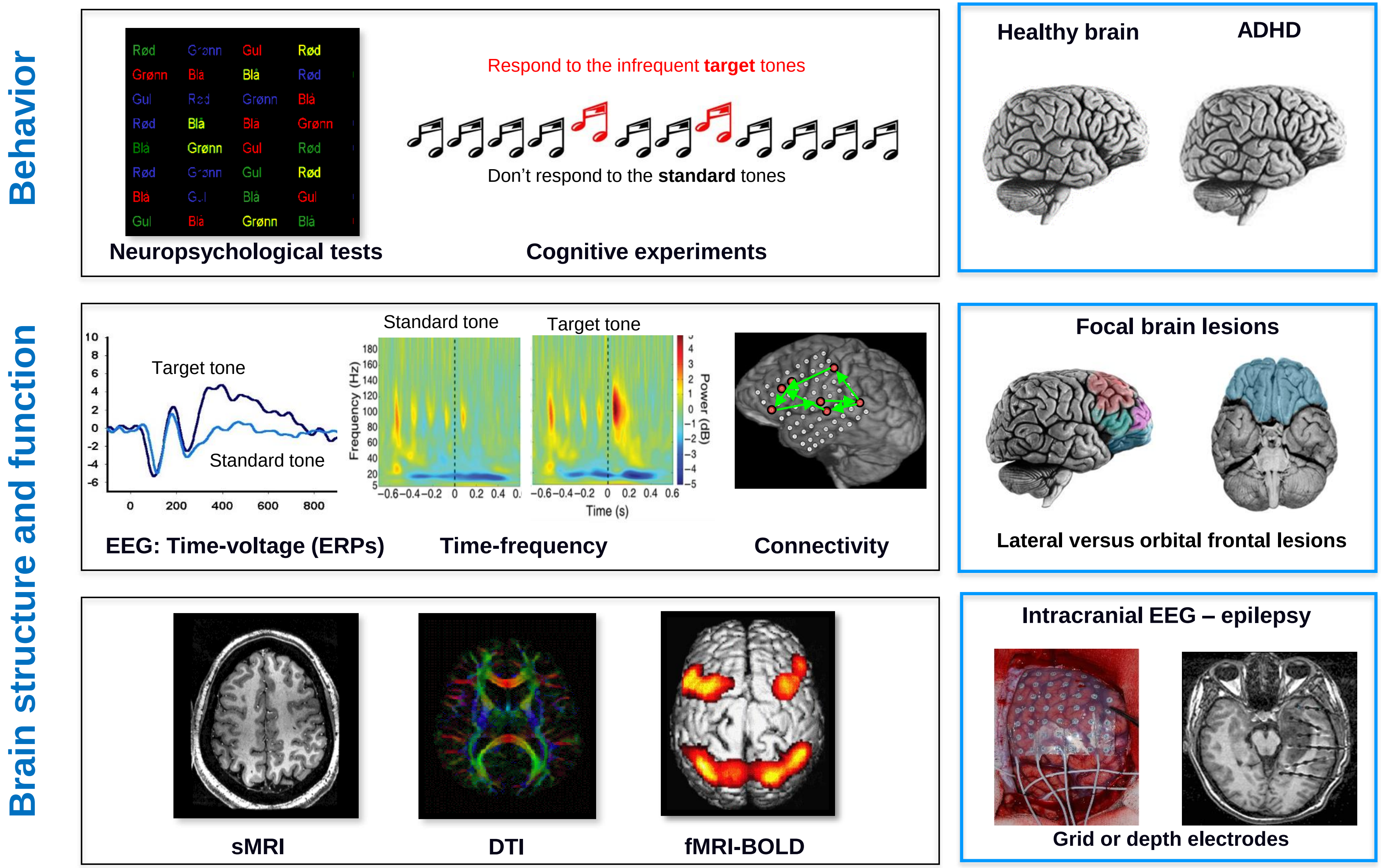
Andel kvinner og menn etter karrierenivå og vitenskapsfelt



NIFU = Nordisk Institutt for studier av innovasjon, forskning og utdanning

Forskning for økt kunnskap om det nevrobiologiske grunnlaget for kognitive kontrollfunksjoner / eksekutiv funksjon

Study participants



J Cogn Neurosci. 2021 Jul 16;1. doi: 10.1162/jocn_e_01754. Online ahead of print.

Introduction to the Special Issue

Brian Levine [1, 2], R Shayna Rosenbaum [1, 3], Anne-Kristin Solbakk [4, 5, 6], Mark D'Esposito [7]

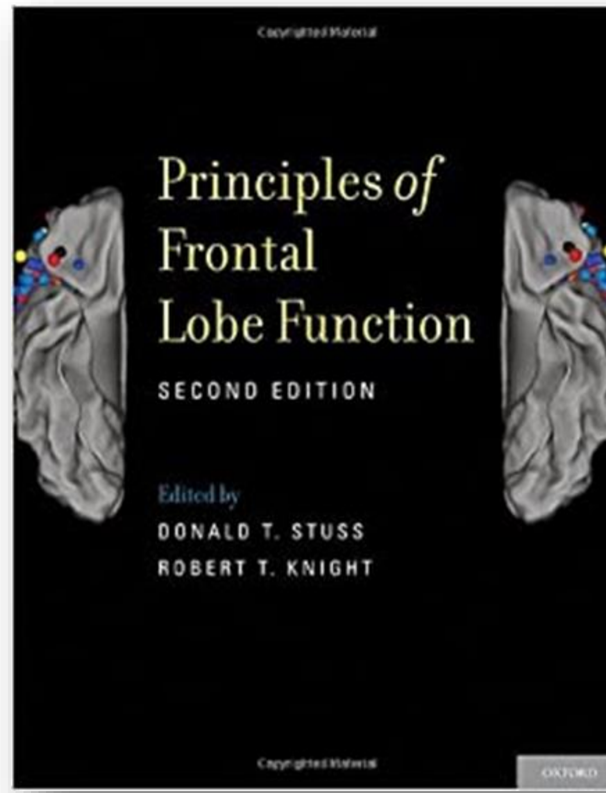
JoCN

MIT Press Direct

Special issue i Journal of Cognitive Neuroscience til ære for avdøde Prof. Donald T. Stuss.

Prof. Donald T. Stuss
Univ. of Toronto

Prof. Robert T. Knight
UC Berkeley; vår samarbeidspartner



Workshop i Mosjøen, i regi av Nevropsykologisk avd., Helgelandssykehuset, 2006

J Cogn Neurosci. 2021 Aug 1;33(9):1956-1975. doi: 10.1162/jocn_a_01733.

Monitoring of Self-Paced Action Timing and Sensory Outcomes After Lesions to the Orbitofrontal Cortex

Anne-Kristin Solbakk [1 2 3], James Lubell [1 4], Sabine Leske [1], Ingrid Funderud [1 3], Anaïs Llorens [2 5], Alejandro O Blenkmann [1], Maja Dyhre Foldal [1], Torstein R Meling [6], Robert T Knight [5], Tor Endestad [1 3]

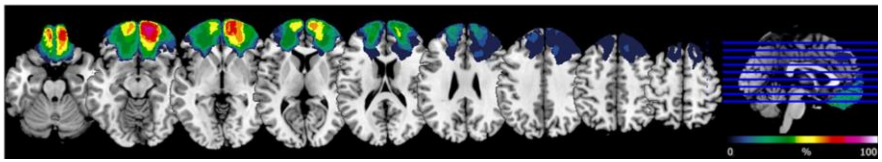
JoCN
MIT Press Direct

Abstract

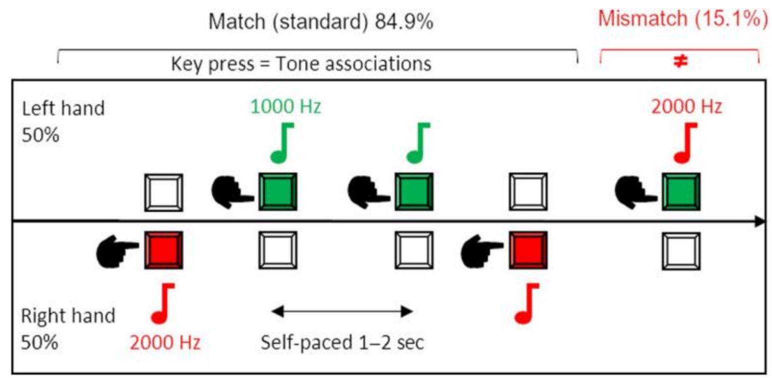
Anticipation, monitoring, and evaluation of the outcome of one's actions are at the core of proactive control. Individuals with lesions to OFC often demonstrate behaviors that indicate a lack of recognition or concern for the negative effects of their actions. Altered action timing has also been reported in these patients. We investigated the role of OFC in predicting and monitoring the sensory outcomes of self-paced actions. We studied patients with focal OFC lesions (n = 15) and healthy controls (n = 20) while they produced actions that infrequently evoked unexpected outcomes. Participants performed a self-paced, random generation task where they repeatedly pressed right and left buttons that were associated with specific sensory outcomes: a 1- and 2-kHz tone, respectively. Occasional unexpected action outcomes occurred (mismatch) that inverted the learned button-tone association (match). We analyzed ERPs to the expected and unexpected outcomes as well as action timing. Neither group showed post-mismatch slowing of button presses, but OFC patients had a higher number of fast button presses, indicating that they were inferior to controls at producing regularly timed actions. Mismatch trials elicited enhanced N2b-P3a responses across groups as indicated by the significant main effect of task condition. Planned within-group analyses showed, however, that patients did not have a significant condition effect, suggesting that the result of the omnibus analysis was driven primarily by the controls. Altogether, our findings indicate that monitoring of action timing and the sensory outcomes of self-paced actions as indexed by ERPs is impacted by OFC damage.

Orbitofrontal cortex

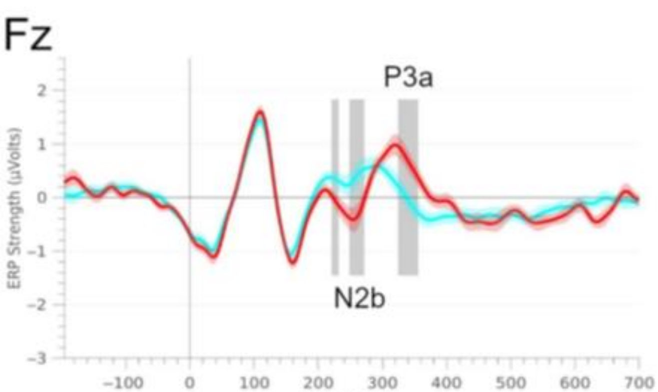
Monitoring of Self-Paced Action Timing and Sensory Outcomes After Lesions to the Orbitofrontal Cortex



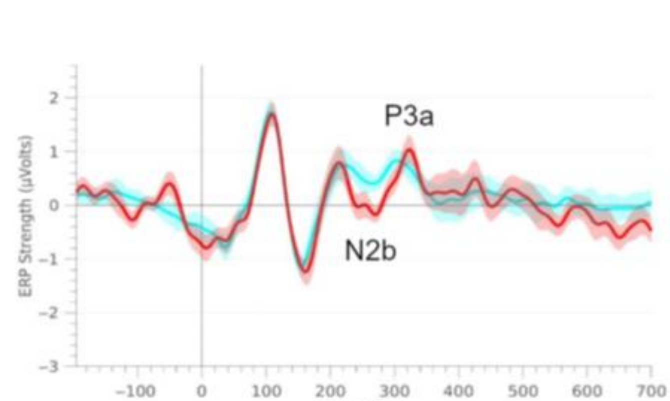
MR-basert rekonstruksjon av orbitofrontale lesjoner; «group overlay»



Friske kontroller



Pasienter med orbitofrontal skade



Turkis = Match med forventning; Rød = Mismatch med forventning

Pasienter med orbitofrontal skade har elektrofysiologiske responser som skiller mindre mellom forventede og ikke-forventede konsekvenser av egne handlinger enn kontrollpersoner.

Top–Down Attentional Modulation in Human Frontal Cortex: Differential Engagement during External and Internal Attention

Julia W Y Kam ✉, Randolph F Helfrich, Anne-Kristin Solbakk, Tor Endestad,
Pål G Larsson, Jack J Lin, Robert T Knight

Cerebral Cortex, Volume 31, Issue 2, February 2021, Pages 873–883,

OXFORD ACADEMIC

Abstract

Decades of electrophysiological research on top-down control converge on the role of the lateral frontal cortex in facilitating attention to behaviorally relevant external inputs. However, the involvement of frontal cortex in the top-down control of attention directed to the external versus internal environment remains poorly understood. To address this, we recorded intracranial electrocorticography while subjects directed their attention externally to tones and responded to infrequent target tones, or internally to their own thoughts while ignoring the tones. Our analyses focused on frontal and temporal cortices. We first computed the target effect, as indexed by the difference in high frequency activity (70-150 Hz) between target and standard tones. Importantly, we then compared the target effect between external and internal attention, reflecting a top-down attentional effect elicited by task demands, in each region of interest. Both frontal and temporal cortices showed target effects during external and internal attention, suggesting this effect is present irrespective of attention states. However, only the frontal cortex showed an enhanced target effect during external relative to internal attention. These findings provide electrophysiological evidence for top-down attentional modulation in the lateral frontal cortex, revealing preferential engagement with external attention.

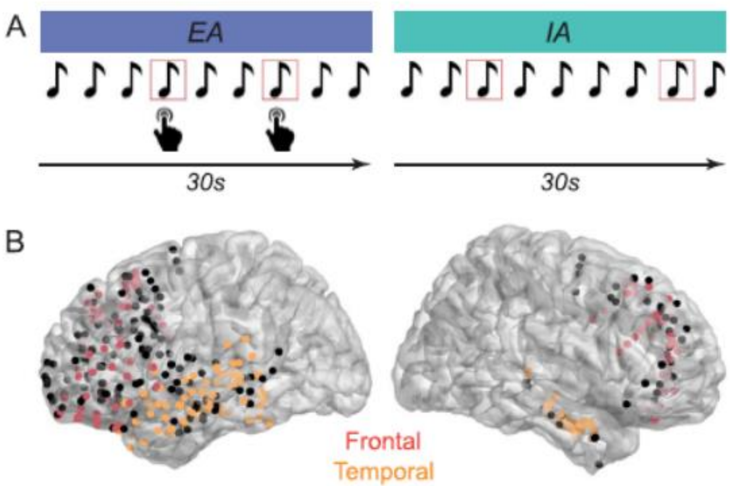
Julia Kam

Robert T. Knight

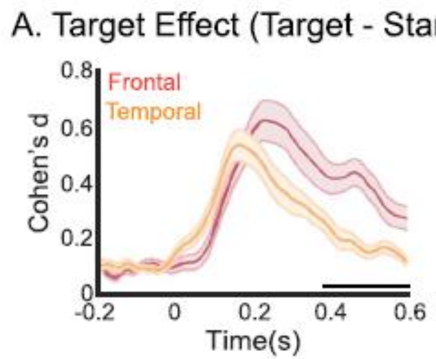
Top–Down Attentional Modulation in Human Frontal Cortex: Differential Engagement during External and Internal Attention

Eksternt rettet oppmerksomhet: Fokuser på tonene og trykk til de høye tonene (target).

Internt rettet oppmerksomhet: Fokuser kun på tankene dine, ignorer tonene.

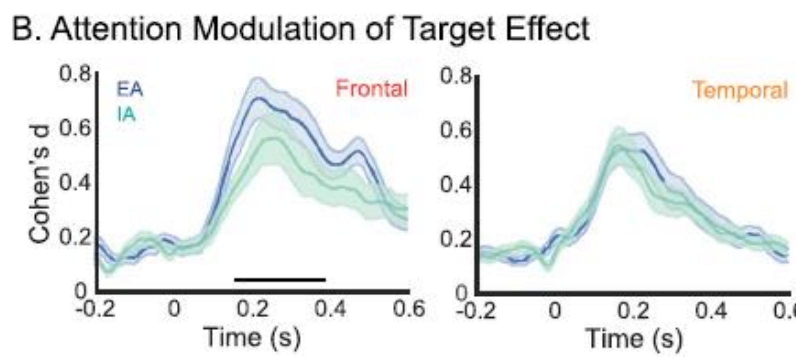


Intrakraniell EEG
Røde prikker: elektroder i frontal korteks som responderer på toner
Oransje prikker: elektroder i temporal korteks som responderer på toner
Sorte prikker: elektroder som ikke responderer på toner



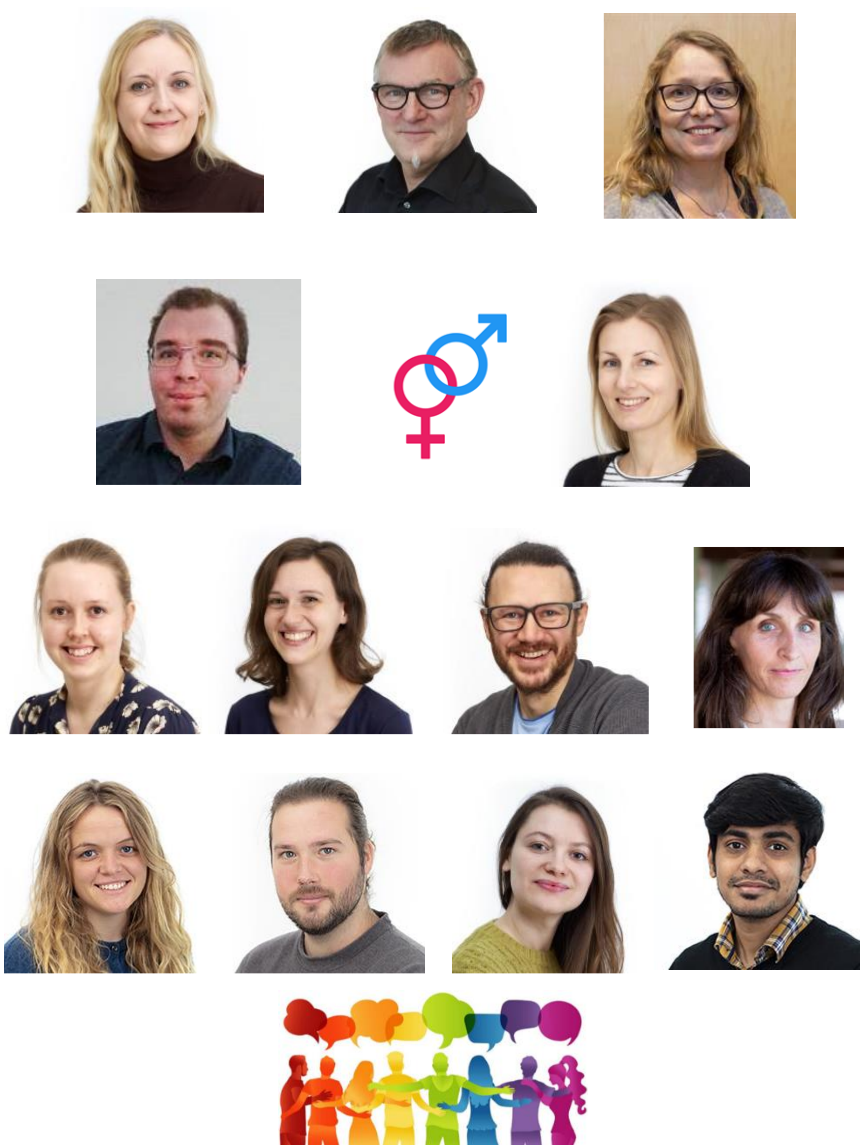
Kurvene illustrerer forskjeller i i gamma aktivitet (70-150 Hz) mellom target og standard tone.

Frontal korteks responderer sterkere og med økt latens til target tone enn temporal korteks.



Frontal korteks responderer sterkere til target toner når oppmerksomheten skal rettes mot tonene enn når personen kun skal fokusere på tankene (blå kurve) sine og ignorere tonene (grønn kurve). Temporal korteks skiller ikke mellom eksternt og internt rettet oppmerksomhet.

Takk for oppmerksomheten!



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