

Predictability Over Uncertainty: A Decision-Making Bias Related to Locus Coeruleus Integrity in Older Adulthood

R. Nathan Spreng

James McGill Professor

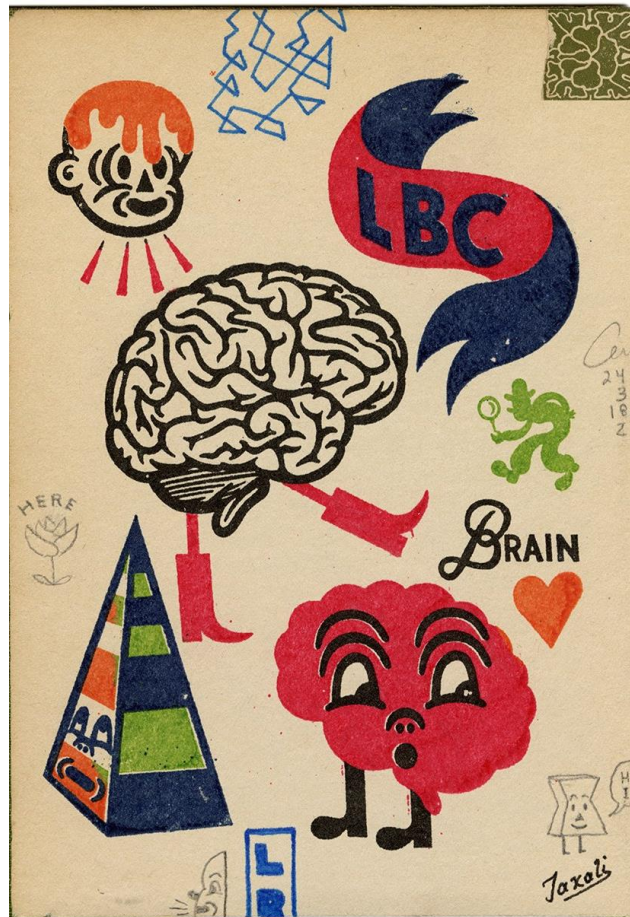
Neurology & Neurosurgery

Cognitive Neuroscience Unit

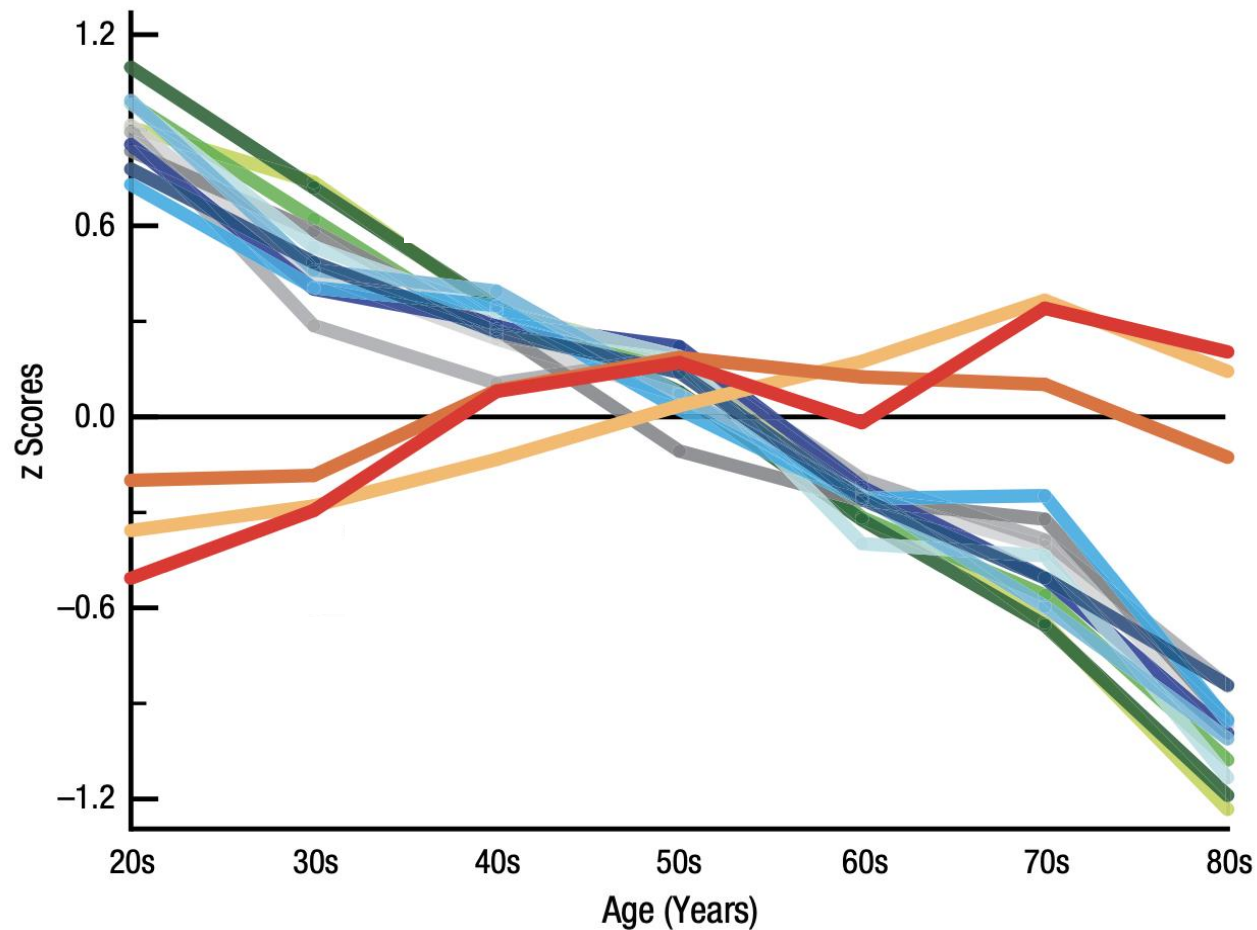
Laboratory of Brain and Cognition

Montreal Neurological Institute

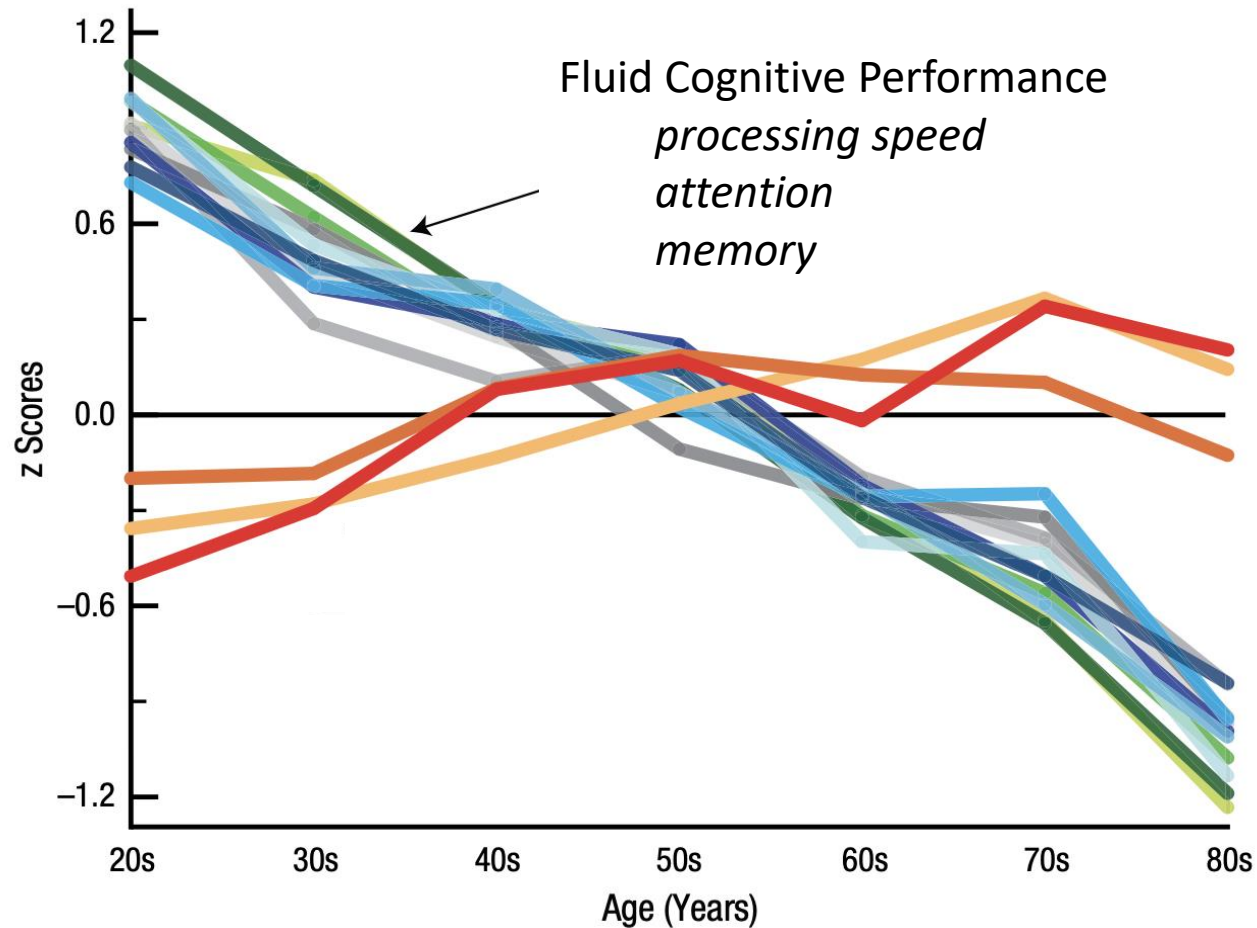
McGill University



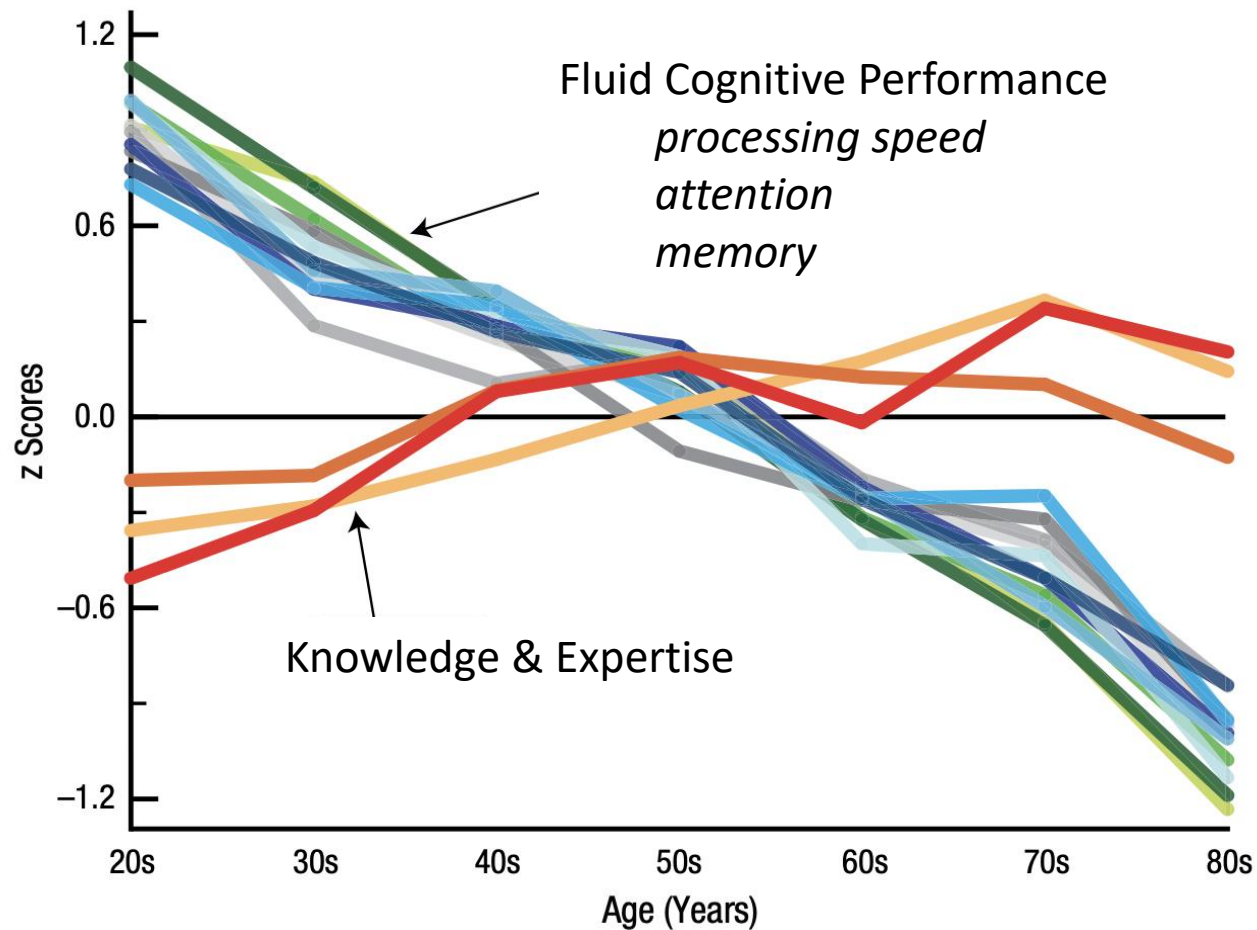
Cognitive change with age



Cognitive change with age



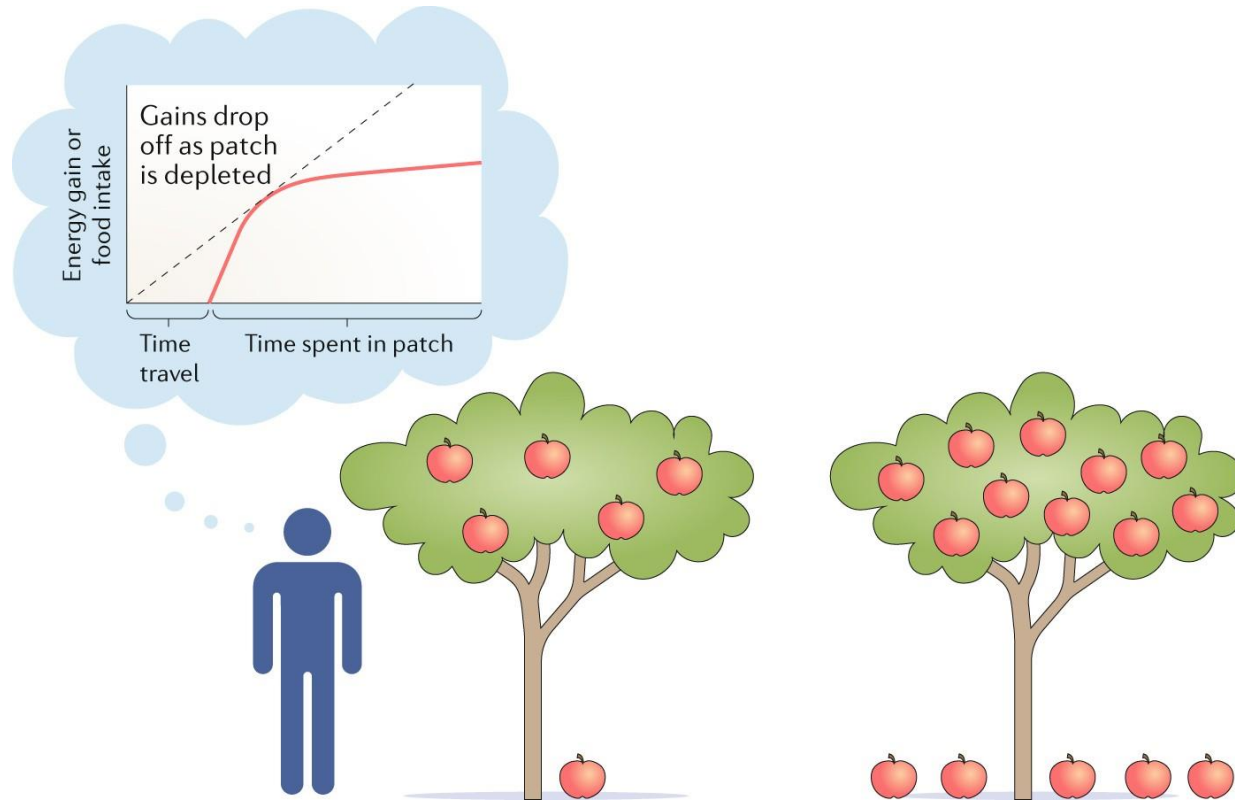
Cognitive change with age



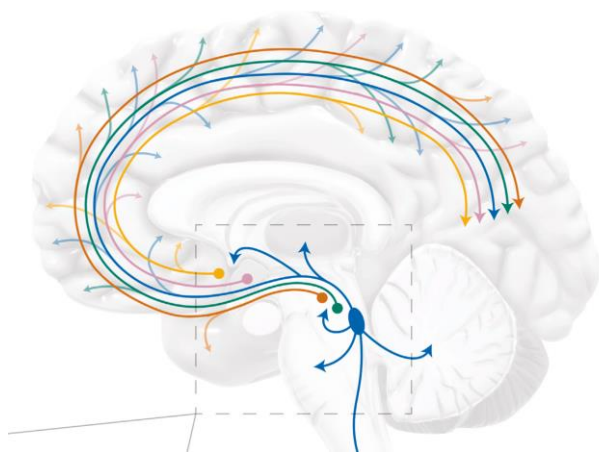
Decision making

Novelty	\vee	Familiarity
<i>Risk of the unknown</i>		<i>Predictable</i>

Novelty v Familiarity: Foraging



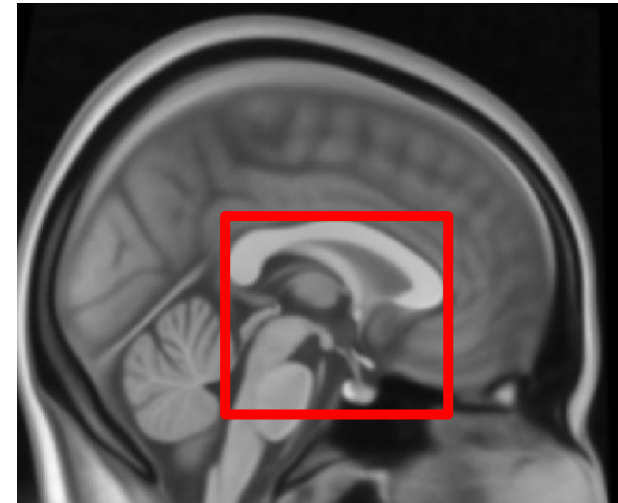
Locus Coeruleus



Engels-Dominguez et al. 2023,
*Neuroscience and
Biobehavioural Reviews*



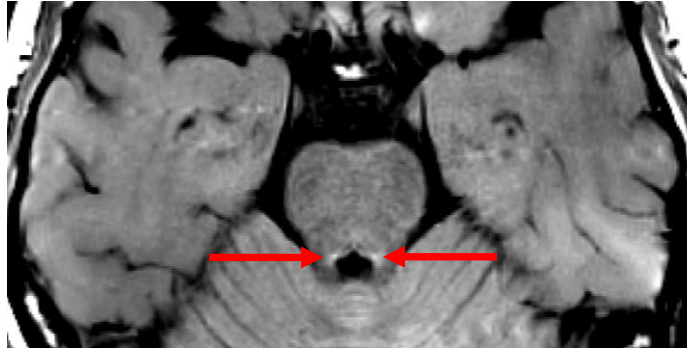
ex vivo locus coeruleus



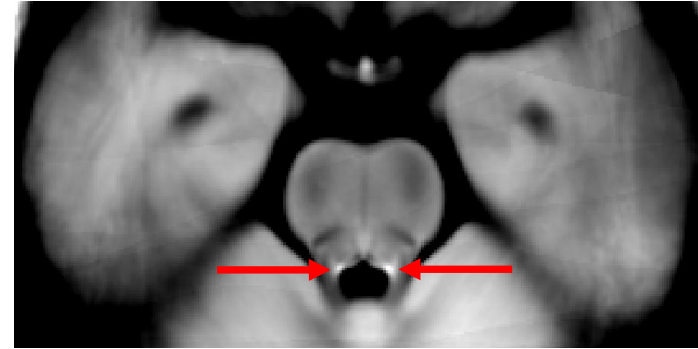
Locus Coeruleus



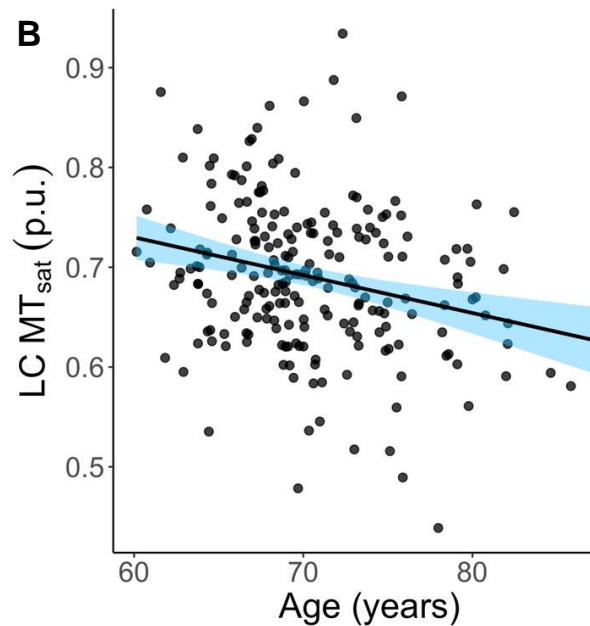
ex vivo locus coeruleus



in vivo MRI neuromelanin contrast



Group average MRI neuromelanin contrast



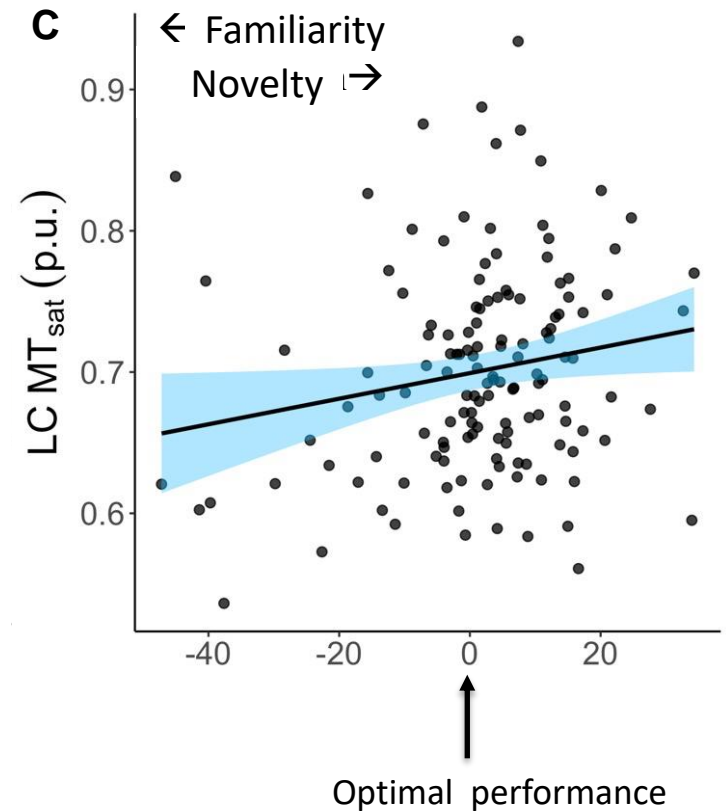
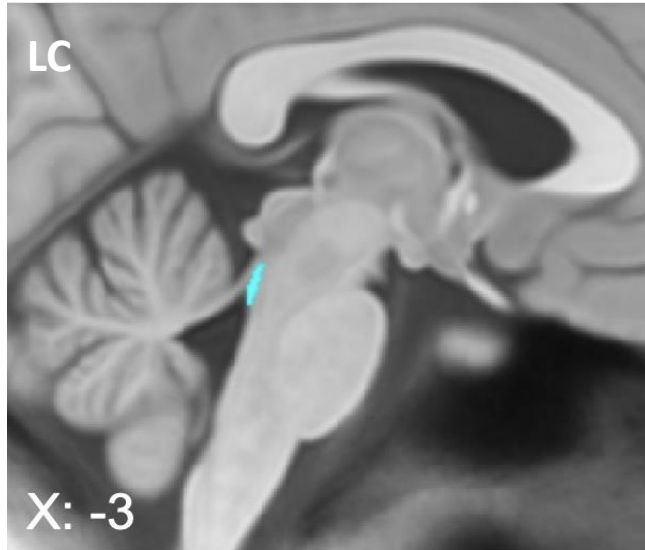
Locus Coeruleus

Foraging Task

Aerial View:
searching for patches



Patch View:
collecting berries











Neuromodulatory subcortical nucleus integrity is associated with white matter microstructure, tauopathy and *APOE* status

Received: 29 November 2023

Accepted: 1 May 2024

Published online: 03 June 2024

 Check for updates

Alfie Wearn ¹✉, Stéfanie A. Tremblay^{2,3,4}, Christine L. Tardif^{1,5,6}, Ilana R. Leppert^{1,5}, Claudine J. Gauthier^{2,3,4}, Giulia Baracchini ¹, Colleen Hughes¹, Patrick Hewan⁷, Jennifer Tremblay-Mercier⁸, Pedro Rosa-Neto ^{1,5,8}, Judes Poirier ^{8,9}, Sylvia Villeneuve ^{5,8,9}, Taylor W. Schmitz ¹⁰, Gary R. Turner ⁷, R. Nathan Spreng ^{1,5,8,9}✉ & PREVENT-AD Research Group*



p75 neurotrophin receptor modulation in mild to moderate Alzheimer disease: a randomized, placebo-controlled phase 2a trial

Received: 1 November 2023

Accepted: 4 April 2024

Published online: 17 May 2024

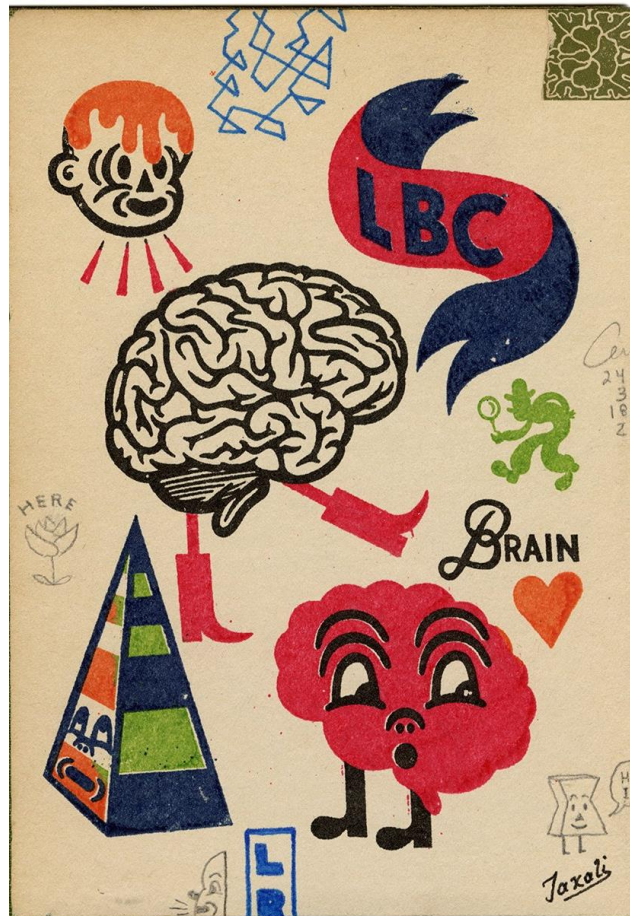
Hayley R. C. Shanks ^{1,2,3} , Kewei Chen ^{4,5,6}, Eric M. Reiman ^{4,5,7,8,9},
Kaj Blennow ^{10,11}, Jeffrey L. Cummings¹², Stephen M. Massa ^{13,14},
Frank M. Longo ¹⁵, Anne Börjesson-Hanson¹⁶, Manfred Windisch ¹⁷ &
Taylor W. Schmitz ^{1,2,3} 



Thank you

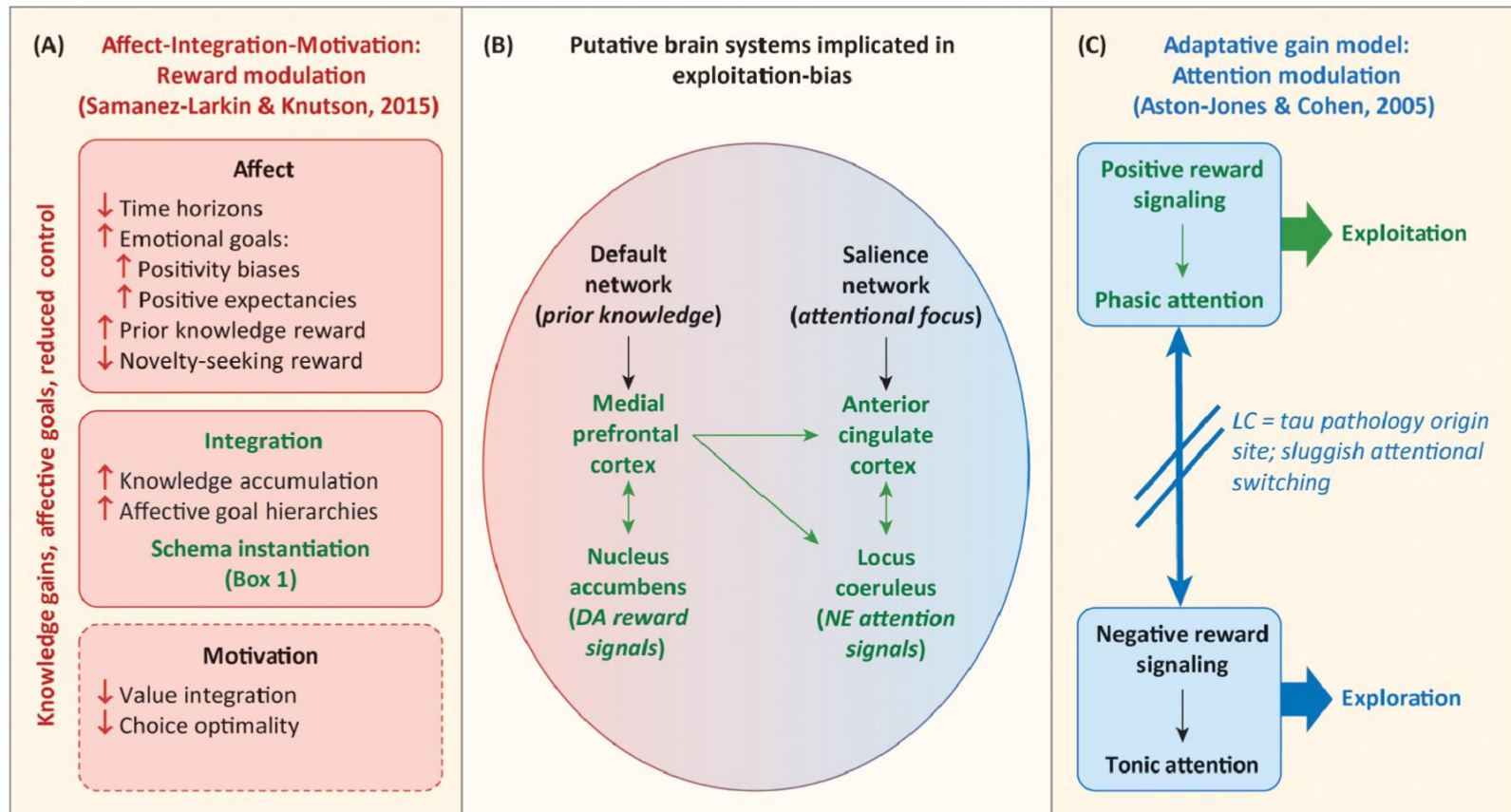
Funding & Collaboration

Canadian Institute of Health Research (CIHR) (Co-PI Gary Turner)
Natural Sciences and Engineering Research Council of Canada (NSERC)
NIH: NIA R01's AG068563 & AG057764
Alzheimer's Association & Brain Canada (AARG-22-927100)
HBHL (CFREF) Innovative Ideas project grant



From exploration to exploitation: a shifting mental mode in late life development

R. Nathan Spreng ^{1,2,3,*} and Gary R. Turner⁴



Key:

■ Green font/arrows indicates predicted 'integration to attention pathway' associated with exploitation bias in older adults.