Les bourses aux cycles supérieures

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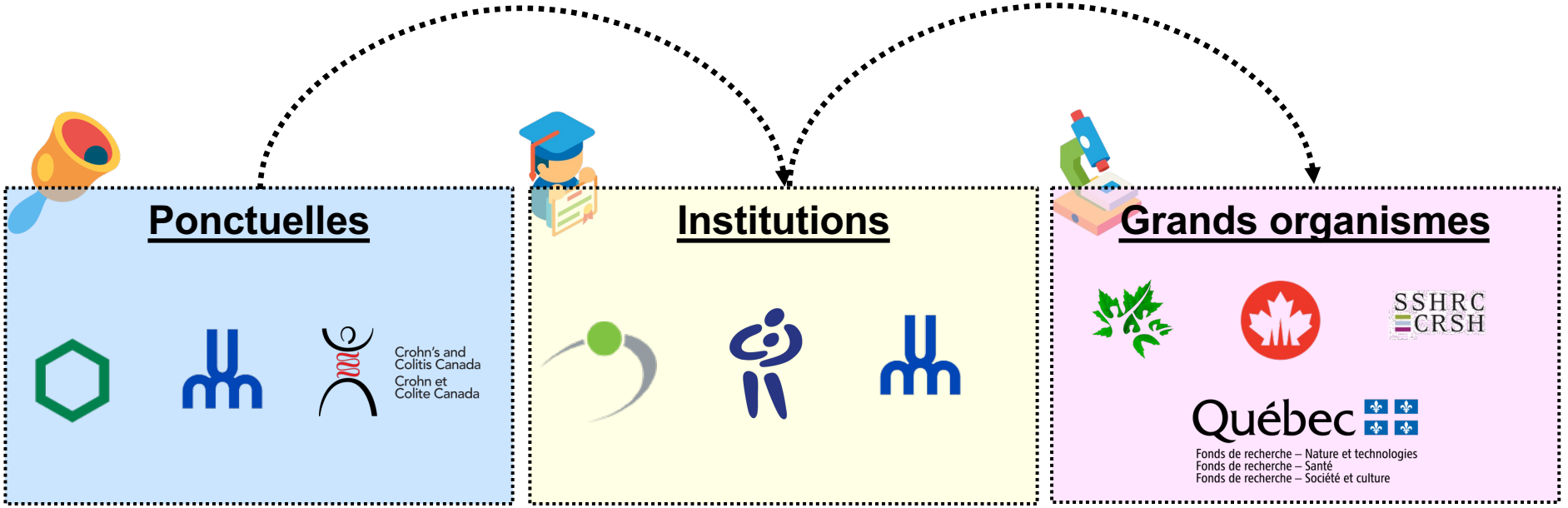


Arrondir les fins de mois
Se payer du luxe

Pouvoir se concentrer sur nos études

Ponctuelles

#2 | Desjardins (2020)

#5 | SAÉ (2021)

#8 | Desjardins (2021)

#9 | Bourse de leadership (2022)

#10 | Bourse d'excellence (2023)

Institutions

#3 | CR de l'IUGM (2020)

#4 | EKSAP Recrutement (2020)

Grands organismes

#1 | CRSNG (2020)

#6 | IRSC BESC M (2021)

#7 | FRQS Maîtrise (2021)

#11 | CRSNG BESC D (2023)

#12 | FRQNT Doctorat (2023)

Ponctuelles

#2 | Desjardins (2020)
3 candidatures

#5 | SAÉ (2021)
3 candidatures

#8 | Desjardins (2021)

#9 | Bourse de leadership (2022)

#10 | Bourse d'excellence (2023)

Institutions

#3 | CR de l'IUGM (2020)

#4 | EKSAP Recrutement (2020)

Grands organismes

#1 | CRSNG (2020)
Wait-listed

#6 | IRSC BESC M (2021)

#7 | FRQS Maîtrise (2021)

Du premier coup, mais…

#11 | CRSNG BESC D (2023)

#12 | FRQNT Doctorat (2023)

> **> 60h** pour les grosses demandes de bourses

SHARED NEUROPHYSIOLOGICAL MECHANISMS IN EFFORT PERCEPTION DURING MOTOR AND COGNITIVE TASKS: ONE EFFORT TO RULE THEM ALL?

▶ **Background** | What do running a marathon and studying for a difficult exam have in common? Both activities require *effort*, the voluntary engagement of physical and cognitive resources towards a specific task[1-3]. Effort exertion is associated with the *"particular feeling of that energy being exerted"* and is accompanied by the *"feeling of difficulty and labor experienced during exertion, a feeling that increases the harder a person tries"*[4]. This conscious experience is the perception of effort (PE)[3 4]. The PE plays an important role in the regulation of human behaviors[1 5 6], including engagement/disengagement from[5 7-11] and performance in[9 11 12] physical and cognitive tasks. Despite the crucial role of the PE in human behaviors[1] and exciting recent advancements in our understanding of its underlying mechanisms[5 13-15], its neurophysiology remains poorly understood. One possible reason is that in the context of motor tasks, the PE is predominantly investigated during physical exercise using whole-body physical[8 9 16-18] or single-joint motor tasks[5 13 14] with little regard for the cognitive component of the tasks. In the context of cognitive tasks, studies predominantly focused on effort allocation without focusing on the PE experienced during task performance[10 19]. However, cognitive functions are involved in motor tasks[20], just like a motor component exists in cognitive tasks. To illustrate, someone doing a cognitive task would provide answers by pressing buttons or giving verbal answers. Conversely, a hockey player needs to decide whether to pass the puck to another player or shoot for the goal. Despite motor and cognitive effort being investigated in silos during behavioral[8 21 22] and neurophysiological[5 13-15 23-25] studies, they share similarities. Motor and cognitive tasks generate the PE[9 15 21], are aversive to humans[1 26], increase autonomic activation[7 13 27-31], and share brain structures (*e.g.*, anterior cingulate cortex [ACC][5 25 32-34]) as well as neural circuits (*e.g.*, corticospinal pathways[35 36]). Nonetheless, little is known on the common mechanisms explaining why motor[37] and cognitive[21] tasks **feel** more effortful with increased task difficulty. Exploring the links between physical and cognitive effort will feed the scientific community's quest for the *one effort to rule them all*[4].

▶ **Objectives & hypotheses** | My PhD project aims to investigate the shared neurophysiological mechanisms of the **perception** of effort during motor and cognitive tasks. Three studies will be conducted to explore the shared behavioral (*study 1*), corticospinal (*study 2*) and cortical (*study 3*) mechanisms. In line with this research, and that effort is known to increase with task difficulty[21 37], each study will involve predominantly motor and cognitive tasks where task difficulty is manipulated by changing the motor and cognitive demand. In ***study 1***, we hypothesize that the PE will increase with the manipulation of motor and cognitive demand, regardless of the task performed. In ***study 2***, we hypothesize that the manipulation of the motor and cognitive demand will modulate the corticospinal pathways to facilitate task performance. In ***study 3***, we hypothesize that changes in the PE from the manipulation of motor and cognitive demand will be reflected in changes in ACC activation.

▶ **Methods** | All three studies rely on the same experimental paradigms developed in the Pageaux lab, for which pilot data confirms changes in the PE in relation to motor and cognitive demand. Based on these data, 30 participants will be recruited for each study (50% female). Each study will be comprised of 3 laboratory visits. *Visit 1* will be a familiarization session, during which participants will be familiarized with all experimental procedures. *Visit 2 and 3* will be the experimental sessions (randomized order), during which the participants will perform either the predominantly motor (visit 2) or cognitive (visit 3) task. For both tasks, motor and cognitive demand will also be manipulated to alter task difficulty and investigate the associated changes in the primary variables of interest. A 2 (domain: *motor* vs *cognitive*) × 2 (demand: *low* vs *high*) repeated-measures design will be applied in each study. Participants will complete 40 trials per visit (*2 domains* × *2 demand levels* × *10 repetitions per condition*). Trials will last 60s, including 20s of motor or cognitive task, followed by 40s for PE rating. This 40s of recovery time is also used to control for fatigue development, a confound known to increase the PE[12].

» ***Motor task (visit 2):*** Participants will perform isometric contractions of the wrist flexors with their dominant hand at 5% (*low motor demand*) and 30% (*high motor demand*) of their maximal force, by matching a force feedback line. Cognitive demand will be manipulated by altering the sensitivity of the visual feedback, *i.e.*, the gain, presented on a screen (normal sensitivity: *low cognitive demand*, high sensitivity: *high cognitive demand*). **Performance will be measured as force steadiness**[38-40].

» ***Cognitive task (visit 3)***: Participants will perform a modified spatial (in)congruency Simon task[41 42] during which participants must identify the direction of arrows presented on a screen. They will provide answers by performing isometric wrist contractions of the left or right wrist flexors, depending on the response to provide, on a bimanual wrist dynamometer (S2P). Cognitive demand will be manipulated with the spatial (in)congruency component of the task: same (e.g., left arrow and left wrist, *low cognitive demand*) or opposite direction (e.g., left arrow and right wrist, *high cognitive demand*). Pilot data from the Pageaux laboratory shows large contrasts in the PE between the proposed conditions. Physical demand will be manipulated by adjusting the minimum isometric force to be produced to validate the answer: 5% or 30% of maximal force (*low* and *high physical demand*). **Performance will be measured as response accuracy** (correct response) **and reaction time** (delay between stimulus apparition and contraction onset).

» ***PE measurement***: In all studies, participants will rate the intensity of their PE with the CR100 scale[43], the psychophysical scale with the strongest psychometric properties to measure the PE[44]. Objective markers of effort will be continuously measured with i) electromyographic (EMG) signal of the flexor carpi radialis and extensor carpi radialis[22], ii) heart rate[45] and iii) respiratory frequency[46].

» ***Study 1 – Behavioral.*** Participants will perform the experimental paradigms described above. We expect that **perceived effort will increase** with higher motor **and** cognitive demand in both tasks.

» ***Study 2 – Transcranial magnetic stimulation (TMS).*** Motor-evoked potentials (MEP) following single- and paired-pulse TMS[47 48] will be recorded while participants perform the paradigms described above. During the **motor task**, TMS will be applied on the dominant M1. Increased visual sensitivity will lead to more perceived errors, which has recently been observed to result in motor inhibition[35]. We expect that corticospinal pathways will be inhibited **(decreased MEP)** with increased cognitive demand of the motor task. Since the difficulty of the **cognitive task** may come from choosing the right movement, double-coil TMS will be randomly applied on the right or left M1 100ms after stimulus presentation (*i.e.*, during the movement preparation phase[42]). We expect the corticospinal pathways to be facilitated **(higher MEP)** on the side of the correct answer and inhibited **(lower MEP)** on the side of the wrong answer.

» ***Study 3 – Neuroimagery.*** Brain activity will be measured via blood-oxygen-level-dependent functional magnetic resonance imaging (fMRI)[49] while the participants perform the experimental paradigms described above. We expect an **increased activity of the ACC** with higher motor and cognitive demand.

▶ **Significance and impact** | To the best of our knowledge, and by breaking the motor and cognitive domain research silos, this study will be the first to identify the shared mechanisms between the PE experienced during motor and cognitive tasks. Results will open new lines of research towards a unified theory encompassing both motor and cognitive aspects of effort.

▶ **Timeline** | *Year 1*: 2023/01-08 – Scoping review to highlight the existing knowledge and gap in the literature on the neural substrate of the PE during physical and cognitive demands, preparation and ethics approval for study 1; 2023/09-12 – Data collection of study 1, preparation and ethics approval for study 2. *Year 2*: 2024/01-08 – Data collection of study 2, preparation and ethics approval for study 3; 2024/09-2025/04 – Writing of combined multi-study manuscript including studies 1 and 2, data collection for study 3 (additional time allocated due to the high solicitation of the fMRI unit). *Year 3*: 2025/05-12 – Writing manuscript of study 3, writing PhD thesis and defense of dissertation. This timeline allows sufficient time for coursework, teaching, and other planned collaborations.

▶ **Feasibility** | The feasibility of my PhD project is secured by i) the **expertise of the supervisors** in psychophysiology (Pageaux and Roy), TMS (Pageaux) and brain imaging (Dr. Roy), ii) the **availability of all necessary material and equipment** in the lab (TMS unit) and the research center (fMRI unit), and iv) my **multidisciplinary academic background** (psychology and kinesiology). This project is related to Pageaux current NSERC-DG (RGPIN-2019-05057).

Conseil #1 – Ayez un système

	A	B	C	D	E	F	G	H	I	J	K
1	Name	Year start	Year end	Organizer	Type	Status	Deadline	Value	Offered	Received	Notes
2	AbbVie Scholarship	2018	-	Crohn Colite Canada	National	Not offered	01-06-2018	$ 5,000.00	-	-	
3	MotivAction	2018	-	Desjardins	Regional	Not offered	13-09-2018	$ 2,000.00	-	-	
4	BESCM-NSERC	2019	2021	NSERC	National	Offered	1-12-2018	$ 17,500.00	$ 7,000.00	$ 7,000.00	Bourse résiduelle de soutien du CRSNG
5	Bourse d'excellence	2019	-	EKSAP	Institutional	Not offered	15-03-2019	$ 1,000.00	-	-	Bourse visant l'implication sportive (e.g., carabin) - Je ne suis pas la cible.
6	MotivAction	2019	-	Desjardins	Regional	Not offered	13-09-2019	$ 2,000.00	-	-	
7	MotivAction	2020	-	Desjardins	Regional	Offered	26-03-2019	$ 2,000.00	$ 2,000.00	$ 2,000.00	
8	Bourses d'étude - Volet B	2020	2021	CRIUGM	Institutional	Offered	8-09-2020	$ 13,000.00	$ 13,000.00	$ 13,000.00	
9	SAÉ - Concours de bourses	2020	-	UdeM	Institutional	Offered	21-09-2021	$ 2,000.00	$ 2,000.00	$ 2,000.00	Robert E. Goudreau (frais de scolarité)
10	Bourse de recrutement	2020	2021	EKSAP	Institutional	Offered	01-11-2021	$ 6,000.00	$ 6,000.00	$ 6,000.00	
11	Formation de maîtrise	2021	2023	FRQS	Provincial	Offered	15-10-2020	$ 35,000.00	$ 35,000.00	$ 17,500.00	Année 2021-2022 finanée par les IRSC
12	BESCM-IRSC	2021	2022	CIHR	National	Offered	01-12-2020	$ 17,500.00	$ 17,500.00	$ 17,500.00	Année 2022-2023 financée par les FRQS
13	Bourse pas comme les autres	2021	-	Desjardins	Regional	Offered	-	$ 1,500.00	$ 1,500.00	$ 1,500.00	
14	Bourse d'excellence (ESP)	2021	-	UdeM	Institutional	Not offered	01-04-2021	Variable	-	-	Ranked first at EKSAP (feedback: need more publications!)
15	Leadership (FACMED)	2022	-	UdeM	Institutional	Offered	30-01-2022	Variable	$ 6,000.00	$ 6,000.00	Applicable: 10 mars 2023
16	Bourse d'excellence (ESP)	2022	-	UdeM	Institutional	Not applied	25-04-2022	Variable	-		Missed it because I'm dum-dumb.
17	Bourse d'excellence de l'EKSAP	2022	-	UdeM	Institutional	Offered	20-10-2022	$3,000.00	$3,000.00	$ 3,000.00	Applicable: 9 janvier 2023
18	Formation de doctorat	2023	2027	FRQNT	Provincial	Offered	6-08-2022	$ 100,000.00	$ 100,000.00		21 000$ par année sur 4 ans
19	BESCD-NSERC	2023	2026	CRSNG	National	Offered	28-08-2022	$ 63,000.00	$ 63,000.00		35 000$ par année sur 3 ans (4e année financée par FRQNT)
20	Forces AVENIR	2023	-	UdeM	Provincial	Not applied	31-03-2023	Variable			Entre 2 000$ et 15 000$
21	Bourse d'excellence (ESP)	2023	-	UdeM	Institutional	Applied	03/2023	Variable			
22	AbbVie Scholarship	2023	-	Crohn Colite Canada	National	Applied	Juin 2023	$ 5,000.00			Frais de scolarité (à éviter lorsque je suis en rédaction)
23	Relève étoile Louis-Berlinguet	2023	-	FRQ	Provincial	Not applied	01-03-2023	$ 1,000.00			
24					Offered	12			$256,000.00	$ 75,500.00	
25					Not offered	5					
26					Applied	2					
27					Not applied	3					

Conseil #2 – Ne placez pas vos œufs dans un seul panier

Il y a plusieurs opportunité de financement dans le milieu académique

- **EKSAP**: Recrutement
- **FacMed**: Bourse de Mérite
- **Gouv.** FRQ, Trois-conseils
- **Centres de recherche affiliés**

Mais…

Opportunité hors-académique

Desjardins

Bourses MotivAction
Collégial – 1 000 $
BSc – 1 500$
MSc & PhD – 2 000$

La Société québécoise d'hypertension artérielle

Bourses de formation
MSc – 15 000$
PhD – 18 000$
Post Doc – 27 000$

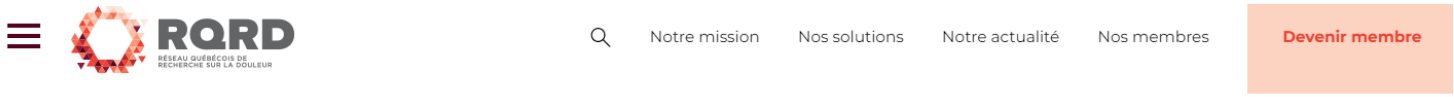
Crohn's and Colitis Canada
Crohn et Colite Canada

Bourse AbbVie
5 000$ (frais de scolarité)

La Société Alzheimer de Québec

Bourses de formation
PhD – 66 000$ / 3 ans
Post Doc– 100 000$ / 2 ans

Conseil #2 – Ne placez pas vos œufs dans un seul panier



PROGRAMME DE BOURSES DE CONGRÈS: JE M'AFFICHE!

CONCOURS #1 – FERMÉ

Date d'ouverture concours: **27 Novembre 2023**

Date limite des soumissions: **10 janvier 2024**

Période d'éligibilité des congrès: **1er Février au 31 Juillet 2024**

CONCOURS #2 – FERMÉ

Date d'ouverture concours: **22 Mai 2023**

Date limite des soumissions: **23 Juin 2023**

Période d'éligibilité des congrès: **1er Août 2023 au 31 Janvier 2024**

Conseil #2 – Ne placez pas vos œufs dans un seul panier

Critères des FRQ:

1. Dossier et parcours académique (MSc & PhD: 30%)
2. Proposition de recherche (MSc: 50%; PhD: 45%)
3. **Mobilisation sociale (MSc: 15%; PhD: 20%)**

Également vrai pour les trois-conseils (MSc: 20%; PhD: ~ 50%)

4. Mobilisation sociale	Bourse de 2e cycle	Bourse de 3e cycle	Bourse postdoctorale
Identification du critère d'évaluation	**Mobilisation sociale**		
Pondération	15	20	20
Sous-critères d'évaluation :			
a. Aptitudes à faire dialoguer la science et la société	√	√	√
b. Capacité d'engagement	√	√	√
c. Prise en considération des objectifs de développement durable des Nations Unies, dont l'équité, la diversité et l'inclusion	√	√	√

Conseil #3 – Utilisez les services d'entraides

Université de Montréal | Études supérieures et postdoctorales

Clinique des bourses

Service offert par les ESP pour soutenir les étudiants aux cycles supérieurs en **recherche** dans leurs demandes de subventions.

Toutes les disciplines sont couvertes

Santé (IRSC, FRQS)
Nature et technologie (CRSNG, FRQNT)
Société et culture (CRSH, FRQSC)

Plusieurs types de bourses

Bourse de recrutement (EKSAP)
Bourse d'excellence (EKSAP, ESP)
Bourse de leadership (FacMed)
Grands organismes (FRQ, trois conseils)

Conseil #4 – Protégez-vous!

MENTAL HEALTH OF GRADUATE STUDENTS SORELY OVERLOOKED

Too few resources exist to help early-career researchers deal with the stresses encountered in today's 'publish or perish' culture. **By Nikki Forrester**

Our respondents were asked if they agree with the statement, "**I have a good work–life balance.**" Of the graduate students who experienced moderate to **severe anxiety**, **56% did not agree** with this statement versus 24% who agreed (Fig. 1c). Additionally, of those graduate students with **depression**, **55% did not agree** with the statement versus 21% who agreed. These results show that good work–life balance is significantly correlated with better mental health outcomes.

Evans et al., *Nat Biotech*, 2018

Merci pour votre attention!