

# Michael J. Carter

ASSISTANT PROFESSOR | SENSORIMOTOR CONTROL & LEARNING

Department of Kinesiology, Faculty of Science, McMaster University

☎ +1 905 525 9140 x20391 | ✉ [michaecarter@mcmaster.ca](mailto:michaecarter@mcmaster.ca) | 🏠 [www.cartermalab.org](http://www.cartermalab.org) | 📞 0000-0002-0675-4271 | 📱 [cartermalab](#) | 🐦 [cartermalab](#)

## Research Interests

Decision-making for action; Human-robot and Human-human interactions; Neuroeconomics of action control; Feedback; Aging; Metascience

## Education

### Postdoctoral Fellowship

CENTRE FOR NEUROSCIENCE STUDIES, QUEEN'S UNIVERSITY

Kingston ON, Canada

2016-17

### Ph.D in Human Kinetics

SCHOOL OF HUMAN KINETICS, UNIVERSITY OF OTTAWA

Ottawa ON, Canada

2011-16

### M.Sc. in Kinesiology

DEPARTMENT OF PHYSICAL EDUCATION & KINESIOLOGY, BROCK UNIVERSITY

St. Catharines ON, Canada

2008-11

### B.Ph.Ed (Honours)

DEPARTMENT OF PHYSICAL EDUCATION & KINESIOLOGY, BROCK UNIVERSITY

St. Catharines ON, Canada

2004-08

## Professional Organizations

Canadian Society for Psychomotor Learning & Sport Psychology (SCAPPS); Society for Transparency, Openness, & Replication in Kinesiology (STORK); Society for the Neural Control of Movement (NCM); North American Society for the Psychology of Sport & Physical Activity (NASPSPA)

## Employment History

### Assistant Professor

DEPARTMENT OF KINESIOLOGY, MCMASTER UNIVERSITY

Hamilton ON, Canada

2017-Present

### Postdoctoral Fellow

CENTRE FOR NEUROSCIENCE STUDIES, QUEEN'S UNIVERSITY

Kingston ON, Canada

2016-17

### Teaching Adjunct Professor

SCHOOL OF KINESIOLOGY AND HEALTH STUDIES, QUEEN'S UNIVERSITY

Kingston ON, Canada

2016-17

### Part-time Professor

SCHOOL OF HUMAN KINETICS, UNIVERSITY OF OTTAWA

Ottawa ON, Canada

2012-16

## Trainees

### MASTERS

Years	Name	Program	Status
2019-21	*Mirette Mounir (SSHRC CGS-M)	Kinesiology	Completed
2019-21	*Rajbir Sidhu (NSERC CGS-M)	Kinesiology	Completed

\*Denotes trainee holds external funding

### DOCTORAL

Years	Name	Program	Status
2018-	*Laura St. Germain (NSERC PGS-D)	Kinesiology	In Progress
2018-	Kyung-Hyun (Ruth) Kim	Psychology	In Progress

\*Denotes trainee holds external funding

## Lifetime Research Funding

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### CURRENT

- [4]. 2018-23, **Carter MJ**. *Establishment of the Memory Action, & Cognition laboratory for the study of human sensorimotor neuroscience*. Ontario Research Fund-Research Infrastructure, \$127,514 total over 5 years.
- [3]. 2018-23, **Carter MJ**. *Establishment of the Memory Action, & Cognition laboratory for the study of human sensorimotor neuroscience*. Canadian Foundation for Innovation John R. Evans Leaders Fund, \$127,514 total over 5 years.
- [2]. 2018-2023, **Carter MJ**. *Decision-making and assignment policies in sensorimotor neuroscience*. Natural Sciences & Engineering Research Council of Canada Discovery Grant, \$149,000 total over 5 years.
- [1]. 2017, **Carter MJ**. Research startup funds from McMaster University, \$1000,000 total (no expiry date).

### PREVIOUS

- [1]. 2018-19, **Carter MJ**. *Decision-making and assignment policies in sensorimotor neuroscience*. Natural Sciences & Engineering Research Council of Canada Discovery Launch Supplement Early Career Researcher, \$12,500 total over 1 year.

## Honours, Awards, Scholarships

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2016, Dean's Award, University of Ottawa, \$3000.

2015, Michael Smith Foreign Study Supplement, Natural Sciences & Engineering Research Council of Canada, \$6000.

2014, Franklin Henry Young Scientist Award (Motor Control and Learning), Canadian Society for Psychomotor Learning & Sport Psychology, \$300.

2013-15, Alexander Graham Bell Canada Graduate Scholarship (Doctoral), Natural Sciences & Engineering Research Council of Canada, \$70,000.

2009-10, Frederick Banting and Charles Best Canada Graduate Scholarship (Masters), Canadian Institutes of Health Research, \$17,500.

2009-10, Ontario Graduate Scholarship (Masters), Province of Ontario, \$15,000 - [Declined]

2008, Undergraduate Student Research Award, Brock University, \$3250

2008, Graduated with First-Class Standing, Brock University

## Scholarly and Professional Activities

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### GRANT, SCHOLARSHIP & AWARD COMMITTEES

Years	Role	Name
2019	Reviewer	Canadian Society for Psychomotor Learning and Sport Psychology Franklin Henry Young Scientist Award
2019	Reviewer	Ontario Women's Health Scholarship
2012-13	Reviewer	University of Ottawa Faculty of Health Sciences Research Funding

### AD HOC JOURNAL REFEREE

Biological Psychology; Canadian Journal of Experimental Psychology; Clinical Neurophysiology; Experimental Brain Research; Human Movement Science; Journal of Learning & Instruction; Journal of Motor Behavior; Journal of Motor Learning & Development; Journal of Sport Sciences; Perceptual & Motor Skills; Psychological Research; Psychology of Sport & Exercise; Research Quarterly for Exercise & Sport

### EXTERNAL GRANT REVIEWS

Years	Role	Name
2019-20	Reviewer	Natural Sciences and Engineering Research Council of Canada 2020 Discovery Grant Competition, Biological Systems and Functions

# Teaching

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## UNDERGRADUATE

Years	Institution	Course
2022-Present	McMaster University	Human Robotics
2018-Present	McMaster University	Motor Control and Learning
2016-17	Queen's University	Motor Learning and Control
2015-16	University of Ottawa	Psychomotor Behaviour Lab
2012-16	University of Ottawa	Motor Control and Learning

## GRADUATE

Years	Institution	Course
2018-Present	McMaster University	Statistical Methods in Kinesiology
2018-Present	McMaster University	Motor Control

# Supervisory committees

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## MASTERS

Years	Name	Program	Status
2020-	Karishma Ramdeo	Kinesiology	In Progress
2019-	Kristen DeMelo	Kinesiology	In Progress
2019-	Noah Erskine	Kinesiology	In Progress
2018	Patrick Dans	Kinesiology	Completed
2018-20	Ashley Flemington	Kinesiology	Completed
2018-20	Jacqueline Brillantes	Kinesiology	Completed
2017-19	Mitchell Locke	Kinesiology	Completed
2017-19	Stephen Toepp	Kinesiology	Completed
2017-19	Stevie Foglia	Kinesiology	Completed
2017-19	Kumara Somasundram	Kinesiology	Completed

## DOCTORAL

Years	Name	Program	Status
2019	Stephen Toepp	Kinesiology	In Progress
2018-	Chantal Carillo	Psychology	In Progress
2018-	Claire Tuckey	Kinesiology	In Progress
2017-19	Jessica Cappelletto	Kinesiology	Completed

# Examination Committees

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## EXTERNAL EXAMINER

Year	Name	Degree	Program	Institution
2020	Molly Brillanger	M.Sc	Kinesiology	Brock University
2018	Stephanie Reischel	M.Sc	Kinesiology	Brock University
2018	Jenin El-Sayes	M.Sc	Kinesiology	McMaster University
2018	Lana Pfaff	M.Sc	Kinesiology	Laurier University
2017	Claire Tuckey	M.Sc	Kinesiology	Brock University
2017	Hunter Fassett	M.Sc	Kinesiology	McMaster University

## INTERNAL EXAMINER

Year	Name	Degree	Program	Institution
2018	Denver Brown	Ph.D	Kinesiology	McMaster University

## COMPREHENSIVE EXAMINER

Year	Name	Degree	Program	Institution
2020	Chantal Carillo	Ph.D	Psychology	McMaster University
2019	Claudia Turco	Ph.D	Kinesiology	McMaster University

## Undergraduate Supervision

### RESEARCH ASSISTANTS

Year	Name	Program	Institution	Type
2021	Elizabeth Mitchell	Integrated Biomedical Engineering & Health Sciences	McMaster University	Co-op
2020	*Allison Williams	Kinesiology	McMaster University	NSERC USRA
2019	*Andrew Poskus	Kinesiology	McMaster University	NSERC USRA

\*Denotes external funding

### RESEARCH PRACTICUMS

Year	Name	Program	Level	Institution
2021	Anita Chaseendran	Life Sciences	III	McMaster University
2021	Gianna Jeyarajan	Life Sciences	III	McMaster University
2021	Kenzie Bell	Kinesiology	III	McMaster University
2021	Ashton Yuen	Kinesiology	III	McMaster University
2021	Charlie Violin	Kinesiology	III	McMaster University
2020	Ammaar Jan	Kinesiology	IV	McMaster University
2020	Faran Chaudhry	Health Sciences	IV	McMaster University
2020	Yu (Sarah) Fu	Health Sciences	III	McMaster University
2019	Andrew Poskus	Kinesiology	III	McMaster University
2019	Maya El-Zahed	Kinesiology	III	McMaster University
2019	Grant Yang	Kinesiology	III	McMaster University
2019	Olena Leshchyshen	Kinesiology	III	McMaster University
2018	Rita Waseem	Life Sciences	III	McMaster University
2018	Christian Kleiser	Kinesiology	III	McMaster University
2018	Chris Li	Kinesiology	III	McMaster University
2018	Faryal Zahir	Biology	IV	McMaster University

### HONOURS THESIS

Year	Name	Program	Level	Institution
2021-22	Raika Bourmand	Kinesiology	IV	McMaster University
2021-22	Armin Sariaslani	Life Sciences	IV	McMaster University
2021-22	Katharine Douglas	Life Sciences	IV	McMaster University
2021-22	Thinzar Soe	Life Sciences	IV	McMaster University
2020-21	Julianna Marfisi	Kinesiology	IV	McMaster University
2020-21	Matthew Tobis	Kinesiology	IV	McMaster University
2020-21	Andrew Poskus	Kinesiology	IV	McMaster University
2019-20	Sherry Feldman	Life Sciences	IV	McMaster University
2019-20	Olena Leschyshen	Kinesiology	IV	McMaster University
2019-20	Noura Balbaa	Kinesiology	IV	McMaster University
2016-17	Lauren Smail*	Psychology	IV	Queen's University
2016-17	Zachary Yantha*	Human Kinetics	IV	University of Ottawa
2015-16	Michelle Nguyen*	Human Kinetics	IV	University of Ottawa
2014-15	Victoria Smith*	Human Kinetics	IV	University of Ottawa
2014-15	Anna Head*	Human Kinetics	IV	University of Ottawa
2013-14	Bethany Cseke*	Human Kinetics	IV	University of Ottawa

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Year	Name	Program	Level	Institution
2013-14	Dylan Klawitter*	Human Kinetics	IV	University of Ottawa
2013-14	Codie Primeau*	Human Kinetics	IV	University of Ottawa
2012-13	Helen Chong*	Human Kinetics	IV	University of Ottawa

\*Denotes co-supervision

## Administrative Responsibilities

Years	Institution	Name
2019-2021	McMaster University	Department of Kinesiology Awards Committee (Undergraduate and Graduate), Member
2019-20	McMaster University	Faculty of Science Awards Committee, Member
2018-20	McMaster University	Department of Kinesiology Undergraduate Curriculum and Policy
2017-Present	McMaster University	Department of Kinesiology Graduate Curriculum and Policy
2012-13	University of Ottawa	CUPE 2626 Human Kinetics Union Steward

## Lifetime Publications

+Denotes trainee

### CURRENT PREPRINTS

[2]. +St. Germain L, +Williams A, +Balbaa N, +Poskus A, +Leshchyshen O, Lohse KR, **Carter MJ**. Increased perceptions of autonomy through choice fail to enhance motor skill retention. *PsyArXiv*. doi: 10.1101/2020.09.02.279414

[1]. de Brouwer AJ, **Carter MJ**, +Smail, LC, Wolpert DM, Gallivan JP, Flanagan JR. Gaze behaviour reveals flexible encoding of competing reach goals under conditions of target uncertainty. *BioRxiv*. doi: 10.31234/osf.io/s34fg

### PEER-REVIEWED JOURNAL ARTICLES

[23.] +McKay B, Hussien J, **Carter MJ**, Yantha Z, & Ste-Marie DM. (2021). Expecting to teach a novel golf putting task did not enhance retention performance: A replication attempt of Daou and colleagues. *Communications in Kinesiology*, 1: 1-21.

[22.] McKay B, Yantha ZD, Hussien J, **Carter MJ**, & Ste-Marie DM. (In-Press). Meta-analytic findings in the self-controlled motor learning literature: Underpowered, biased, and lacking evidential value. *Meta-Psychology*.

[21]. Barros JAC, +Yantha ZD, **Carter MJ**, Hussein J, Ste-Marie DM (2019). Examining the impact of error estimation on the effects of self-controlled feedback. *Human Movement Science*, 63: 182–198.

[20]. **Carter MJ**, +Smith V, Carlsen AN, Ste-Marie DM (2018). Anodal transcranial direct current stimulation over the primary motor cortex does not enhance the learning benefits of self-controlled feedback schedules. *Psychological Research*, 82: 496–506.

[19]. **Carter MJ**, Ste-Marie DM (2017). Not all choices are created equal: Task-relevant choices enhance motor learning compared to task-irrelevant choices. *Psychonomic Bulletin & Review*, 24:1879–1888.

[18]. Maslovat D, **Carter MJ**, Carlsen AN (2017). Response preparation and execution during intentional bimanual pattern switching. *Journal of Neurophysiology*, 118: 1720–1731.

[17]. **Carter MJ**, Ste-Marie DM (2017). An interpolated activity during the knowledge-of-results delay interval eliminates the learning advantages of self-controlled feedback schedules. *Psychological Research*, 81: 399–406.

[16]. **Carter MJ**, Maslovat D, Carlsen AN (2017). Intentional switches between coordination patterns are faster following anodal-tDCS applied over the supplementary motor area. *Brain Stimulation*, 10:162-164.

[15]. Ste-Marie DM, **Carter MJ**, Law B, Vertes K, +Smith V (2016). Self-controlled learning benefits: Exploring contributions of self-efficacy and intrinsic motivation via path analysis. *Journal of Sport Sciences*, 34: 1650–1656.

[14]. **Carter MJ**, Rathwell S, Ste-Marie DM (2016). Motor skill retention is modulated by strategy choice during self-controlled knowledge of results schedules. *Journal of Motor Learning & Development*, 4: 100-115.

- [13]. Patterson JT, Hart A, Hansen S, **Carter MJ**, Ditor D (2016). Measuring investment in learning: Can electrocardiogram provide an indication of cognitive effort during learning?. *Perceptual & Motor Skills*, 122: 375–394.
- [12]. **Carter MJ**, <sup>+</sup>Smith V, Ste-Marie DM (2016). Judgments of learning are significantly higher following feedback on relatively good versus relatively poor trials despite no actual learning differences. *Human Movement Science*, 45: 63–70.
- [11]. Martini R, **Carter MJ**, <sup>+</sup>Yoxon E, Cumming J, Ste-Marie DM (2016). Development and validation of the Movement Imagery Questionnaire for Children (MIQ-C). *Psychology of Sport & Exercise*, 22:190–201.
- [10]. Maslovat D, Drummond NM, **Carter MJ**, Carlsen AN (2015). Startle activation is additive with voluntary cortical activation irrespective of stimulus modality. *Neuroscience Letters*, 606: 151–155.
- [9]. Maslovat D, Drummond NM, **Carter MJ**, Carlsen AN (2015). Reduced motor preparation during dual-task performance: Evidence from startle. *Experimental Brain Research*, 233: 2673–2683.
- [8]. **Carter MJ**, Maslovat D, Carlsen AN (2015). Anodal transcranial direct current stimulation applied over the supplementary motor area delays spontaneous antiphase-to-in-phase transitions. *Journal of Neurophysiology*, 133: 780–785.
- [7]. **Carter MJ**, Carlsen AN, Ste-Marie DM (2014). Self-controlled feedback is effective if it is based on the learner's performance: A replication and extension of Chiviacowsky and Wulf (2005). *Frontiers in Psychology*, 5: Article 1325.
- [6]. Maslovat D, **Carter MJ**, Kennefick M, Carlsen AN (2014). Startle neural activity is additive with normal cortical initiation-related activation. *Neuroscience Letters*, 558: 164–168.
- [5]. Bajema MC, MacKinnon CD, **Carter MJ**, Kennefick M, Perlmutter S, Carlsen AN (2013). Pause time alters the preparation of two-component movements. *Experimental Brain Research*, 231: 85–96.
- [4]. Patterson JT, **Carter MJ**, Hansen S (2013). Self-controlled KR schedules: Does repetition order matter? *Human Movement Science*, 31: 1459–1472.
- [3]. **Carter MJ**, Patterson JT (2012). Self-controlled knowledge of results: Age-related differences in motor learning, strategies, and error detection. *Human Movement Science*, 31: 1459–1472.
- [2]. Patterson JT, **Carter MJ**, Sanli E (2011). Decreasing the proportion of self-control trials during the acquisition period does not compromise the learning advantages in a self-controlled context. *Research Quarterly for Exercise & Sport*, 82: 624–633.
- [1]. Patterson JT, **Carter MJ** (2010). Learner regulated knowledge of results during the acquisition of multiple timing goals. *Human Movement Science*, 29: 214–227.

## BOOK CHAPTERS

- [1]. Ste-Marie DM, **Carter MJ**, <sup>+</sup>Yantha ZD (2019). Self-controlled learning: Current findings, theoretical perspectives, and future directions. In N Hodges & AM Williams (eds.) Chapter 7, *Skill acquisition in sport: Research, theory, and practice*, 3rd Edition.

## Talks

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- [8]. Open and reproducible research in a productivity demanding academic world. Motor Learning and Control Online Research Seminar Series, *North American Society for Psychology of Sport & Physical Activity*. Invited team talk with Drs. Diane Ste-Marie, Keith Lohse, and Matthew Miller, Nov 2020.
- [7]. Motor learning and self-controlled practice conditions: What we know after 25 years of research. Distinguished lecture series, *Auburn University*. Invited, **Postponed due to Covid-19**.
- [6]. Embracing uncertainty and learning to learn. Neuroscience Tutorial, *McMaster University*. Invited, Jan 2019.
- [5]. Self-controlled feedback and error estimation. Symposium on “Errors make you better: Behavioural, theoretical, and neurophysiological determinates of error processing in motor learning,” *Canadian Society for Psychomotor Learning & Sport Psychology*. Invited, Oct 2018.
- [4]. Decision-making for action control and learning. Kinesiology Seminar Series, *McMaster University*. Invited, Sept 2017.

- [3]. Cognition and motor skill learning: Insights from learner-controlled protocols. Centre for Neuroscience Studies Seminar Series, *Queen's University*. Invited, May 2016.
- [2]. Self-controlled feedback and motor learning. Franklin Henry Young Scientist Award Presentation, *Canadian Society for Psychomotor Learning & Sport Psychology*. Invited, Oct 2014.
- [1]. Cognitive processes underlying the learning advantages of self-controlled feedback schedules. Biokinesiology & Physical Therapy Seminar Series, *University of Southern California*. Invited, March 2015.

## Conference Presentations

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**Presenting author(s);** <sup>+</sup>Denotes trainee

2021

- [43.] Lokesh R Calalo J, Roth A, Carter MJ, Cashaback JGA. Rapid decision-making during competitive human-human sensorimotor interactions. Talk given at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Virtual Conference due to Covid-19.
- [42.] Roth A, Lokesh R, Calalo J, Carter MJ, Cashaback JGA. The influence of reward feedback and error feedback on sensorimotor exploration. Talk given at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Virtual Conference due to Covid-19.
- [41.] **+St. Germain L**, <sup>+</sup>McKay B, <sup>+</sup>Williams A, <sup>+</sup>Leshchyshen O, <sup>+</sup>Poskus A, <sup>+</sup>Feldman S, Cashaback JGA, Carter MJ. Binary feedback prevents a self-controlled learning advantage. Talk given at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Virtual Conference due to Covid-19.
- [40.] **+Marfisi J**, <sup>+</sup>St. Germain L, Carter MJ. The persistence of inappropriate outcome variables in motor learning experiments: A follow-up to Fischman (2015). Poster presented at the Annual Meeting of the *North American Society for Psychology of Sport & Physical Activity*; Virtual Conference due to Covid-19.
- [39.] **Hussien J**, McKay B, Carter MJ, Yantha Z, Brooks H, Hassin J, Turenne M, Ste-Marie DM. Failure to demonstrate an 'expecting to teach' benefit: A replication and extension experiment. Talk given at the Annual Meeting of the *North American Society for Psychology of Sport & Physical Activity*; Virtual Conference due to Covid-19.

2020

- [38.] **+St. Germain L**, <sup>+</sup>Williams A, <sup>+</sup>Poskus A, <sup>+</sup>Balbua N, <sup>+</sup>Leshchyshen O, Lohse KR, Carter MJ. Self-controlled learning: Making a yoked group explicitly aware of being denied choice. Talk given at the Annual Meeting of the *North American Society for Psychology of Sport & Physical Activity*; Virtual Conference due to Covid-19.

2019

- [37.] **+St. Germain L**, <sup>+</sup>Leshchyshen O, <sup>+</sup>Williams A, Carter MJ. Manipulating the characteristics of self-controlled feedback schedules. Talk given at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Vancouver BC, Canada.
- [36.] **+Williams A**, **+St. Germain L**, <sup>+</sup>Leshchyshen O, Carter MJ. Error estimation abilities and self-controlled feedback schedules. Poster presented at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Vancouver BC, Canada.
- [35.] **+St. Germain L**, **+Leshchyshen O**, Carter MJ. Assessing the evidential value of incidental choices for motor learning. Poster presented at the Annual Meeting of the *North American Society for Psychology of Sport & Physical Activity*; Baltimore MD, United States.
- [34.] **Yantha ZD**, McKay B, Carter MJ, Ste-Marie DM. The effects of choice on motor skill learning: A meta-analysis of self-controlled research findings. Poster presented at the Annual Meeting of the *North American Society for Psychology of Sport & Physical Activity*; Baltimore MD, United States.

2018

- [33.] <sup>+</sup>Zahir F, **+St. Germain L**, **Carter MJ**. Inconvenient findings for the "OPTIMAL" theory of motor learning. Poster presented at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Toronto ON, Canada.

## 2017

- [32]. **Gale D**, Carter MJ, Wolpert DM, Gallivan JP, Flanagan JR. Dynamic motor encoding of targets in multiple target tracking. Poster presented at the Annual Meeting of the *Society for Neuroscience*; Washington DC, United States.
- [31]. **Carter MJ**, de Brouwer AJ, <sup>+</sup>Smail L, Wolpert DM, Gallivan JP, Flanagan JR. Gaze behaviour reveals the specification of competing reach movements under conditions of target uncertainty. Talk given at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; St. John's NF, Canada.
- [30]. <sup>+</sup>**Yantha ZD**, Carter MJ, Hussein J, Cotnam HP, Ste-Marie DM. Using error estimation to better understand the advantages of self-controlled practice. Talk given at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; St. John's NF, Canada.
- [29]. **Carter MJ**, de Brouwer AJ, <sup>+</sup>Smail L, Wolpert DM, Gallivan JP, Flanagan JR. Gaze behaviour reveals the specification of competing reach movements. Poster presented at the Annual Meeting of the *Society for the Neural Control of Movement*; Dublin, Ireland.

## 2016

- [28]. <sup>+</sup>Yantha ZD, **Carter MJ**, Ste-Marie DM. Task-relevant and task-irrelevant choices differentially impact error estimation and motor learning. Talk given at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Waterloo ON, Canada.
- [27]. **Carter MJ**, <sup>+</sup>Elnakouri A, <sup>+</sup>Yantha ZD, Ste-Marie DM. Not all choices are created equal: The differential impact of task-relevant and task-irrelevant choices on motor learning. Poster presented at the Annual Meeting of the *North American Society for Psychology of Sport & Physical Activity*; Montreal QC, Canada.
- [26]. **Carter MJ**, Maslovat D, Carlsen AN. A startling acoustic stimulus suggests advance preparation of intentional bimanual switches. Poster presented at the Annual Meeting of the *Society for the Neural Control of Movement*; Montego Bay, Jamaica.

## 2015

- [25]. **Ste-Marie DM**, Carter MJ, Law B, Smith V, Vertes KA. *Self-controlled learning benefits: Exploring contributions of self-efficacy and intrinsic motivation via path analysis*. Poster presented at the Annual Meeting of the European Congress of Sport Psychology\*; Bern, Switzerland.
- [24]. **Carter MJ**, Carlsen AN, <sup>+</sup>Smith V, Ste-Marie DM. Anodal transcranial direct current stimulation applied over the primary motor cortex does not enhance the learning benefits of self-controlled KR schedules. Poster presented at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Edmonton AB, Canada.
- [23]. **Carter MJ**, <sup>+</sup>Head CA, Puveendran P, Ste-Marie DM. Eliminating the learning benefits of self-controlled knowledge of results (KR) schedules: The importance of information processing activities during the KR-delay interval. Talk given at the Annual Meeting of the *North American Society for Psychology of Sport & Physical Activity*; Portland OR, United States.
- [22]. **Carter MJ**, Carlsen AN, Ste-Marie DM. Self-controlled feedback is effective if it is based on the learner's performance: A replication and extension of Chiviacowsky & Wulf (2005). Talk given at the Annual Meeting of the *North American Society for Psychology of Sport & Physical Activity*; Portland OR, United States.
- [21]. **Carter MJ**, Maslovat D, Nguyen M, Carlsen AN. The learning of a 90-degree relative phase bimanual coordination pattern: A transcranial direct current stimulation investigation. Poster presented at the Annual Meeting of the *Society for the Neural Control of Movement*; Charleston SC, United States.

## 2014

- [20]. **McKay B**, **Carter MJ**, Rathwell S, Ste-Marie DM. The learning benefits of self-controlled feedback schedules are modulated by strategy choice: A mixed-methods approach. Poster presented at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; London ON, Canada.
- [19]. **Drummond NM**, Maslovat D, Carter MJ, Chiocchi A, Carlsen AN. Startle activation is additive with voluntary cortical activation irrespective of stimulus modality. Poster presented at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; London ON, Canada.



[18]. **Carter MJ**, <sup>+</sup>Klawitter D, Carlsen AN, Ste-Marie DM. The option of receiving knowledge of results following performance leads to increased motor learning. Talk given at the Annual Meeting of the *North American Society for Psychology of Sport & Physical Activity*; Minneapolis MN, United States.

[17]. **Carter MJ**, <sup>+</sup>**Smith V**, Carlsen AN, Ste-Marie DM. Awareness of “good” versus “poor” feedback content does not mitigate illusions of competency. Poster presented at the Annual Meeting of the *North American Society for Psychology of Sport & Physical Activity*; Minneapolis MN, United States.

[16]. **McKay B**, Carter MJ, Ste-Marie DM. Self-controlled learning: A meta-analysis. Poster presented at the Annual Meeting of the *North American Society for Psychology of Sport & Physical Activity*; Minneapolis MN, United States.

[15]. **Carter MJ**, <sup>+</sup>Cseke B, Drummond NM, Carlsen AN. Intentional phase transitions in bimanual coordination following tDCS. Poster presented at the Annual Meeting of the *Society for the Neural Control of Movement*; Amsterdam, The Netherlands.

[14]. **Drummond NM**, Scantland-Lebel I, Carter MJ, Maslovat D, Carlsen AN. Startle reveals motor preparatory state associated with differential attentional demands. Poster presented at the Annual Meeting of the *Society for the Neural Control of Movement*; Amsterdam, The Netherlands.

## 2013

[13]. **Carter MJ**, Drummond NM, Carlsen AN. Anodal tDCS decreases mean relative phase error during anti-phase movements. Poster presented at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Kelowna BC, Canada.

[12]. **Ste-Marie DM**, Law B, **Carter MJ**, Westlund N, Divine A, Martini R. Group versus individual administration of Movement Imagery Questionnaire for Children yields different movement imagery scores. Poster presented at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Kelowna BC, Canada.

[11]. Vertes KA, **Carter MJ**, <sup>+</sup>Smith V, Ste-Marie DM. Self-controlled video feedback is effective for learning when children adopt higher viewing frequencies. Talk given at the Annual Meeting of the *North American Society for Psychology of Sport & Physical Activity*; New Orleans LA, United States.

[10]. **Carter MJ**, <sup>+</sup>Yoxon E, Ste-Marie DM, Cumming J, Martini R. The validation of a movement imagery questionnaire for children (MIQ-C). Poster presented at the Annual Meeting of the *North American Society for Psychology of Sport & Physical Activity*; New Orleans LA, United States.

[9]. **Carter MJ**, Maslovat D, Drummond NM, Kennefick M, Carlsen AN. Startle neural activity is additive with normal cortical initiation-related activation. Poster presented at the Annual Meeting of the *Society for the Neural Control of Movement*; San Juan, Puerto Rico.

[8]. **Drummond NM**, Hayduk-Costa G, Carter MJ, Carlsen AN. Bi-hemispheric tDCS over motor cortex does not influence free choice. Poster presented at the Annual Meeting of the *Society for the Neural Control of Movement*; San Juan, Puerto Rico.

## 2012

[7]. **Carter MJ**, Drummond NM, Ste-Marie DM, Carlsen AN. Providing knowledge of results based on an absolute performance bandwidth results in illusions of competency. Talk given at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Halifax NS, Canada.

[6]. **Hayduk-Costa G**, Drummond NM, Carter MJ, Carlsen AN. Turbocharging the “go”-horse: Anodal tDCS results in early response initiation in an anticipation timing task. Talk given at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Halifax NS, Canada.

[5]. **Kennefick M**, Carter MJ, Bajema MC, Carlsen AN. Dwell time mediates the preparation of single versus multiple component movements. Poster at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Halifax NS, Canada.

## 2011

[4]. **Carter MJ**, Patterson JT. Self-controlled practice: Learning differences between younger and older adults. Poster presented at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Winnipeg MB, Canada.

2010

[3]. **Carter MJ**, Patterson JT. Self-controlled KR: Does it facilitate an internal representation of a spatial motor task?. Poster presented at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Ottawa ON, Canada.

[2]. **Carter MJ**, Patterson JT, Hansen S. Learner-controlled KR: Does repetition order matter?. Poster presented at the Annual Meeting of the *North American Society for Psychology of Sport & Physical Activity*; Tuscan AZ, United States.

2009

[1]. **Carter MJ**, Patterson JT. Manipulating the structure of a learner-controlled KR practice context: Do the learning advantages persist?. Poster presented at the Annual Meeting of the *Canadian Society for Psychomotor Learning & Sport Psychology*; Toronto ON, Canada.