# Michael J. **Carter**

Assistant Professor | Sensorimotor Control & Learning

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## Research Interests

Decision-making for action; Joint action (Human-Human and Human-Robot); Feedback; Aging; Metascience

## Education

**Postdoctoral Fellowship** — *Kingston ON, Canada*
Centre for Neuroscience Studies, Queen's University — *2016-17*

**Ph.D in Human Kinetics** — *Ottawa ON, Canada*
School of Human Kinetics, University of Ottawa — *2011-16*

**M.Sc. in Kinesiology** — *St. Catharines ON, Canada*
Department of Physical Education & Kinesiology, Brock University — *2008-11*

**B.Ph.Ed (Honours)** — *St. Catharines ON, Canada*
Department of Physical Education & Kinesiology, Brock University — *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** — *Hamilton ON, Canada*
Department of Kinesiology, McMaster University — *2017-Present*

**Postdoctoral Fellow** — *Kingston ON, Canada*
Centre for Neuroscience Studies, Queen's University — *2016-17*

**Teaching Adjunct Professor** — *Kingston ON, Canada*
School of Kinesiology and Health Studies, Queen's University — *2016-17*

**Part-time Professor** — *Ottawa ON, Canada*
School of Human Kinetics, University of Ottawa — *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 - On maternity leave until Aug 2022 |

*Denotes trainee holds external funding

## Lifetime Research Funding

### 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

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

## Scholarly and Professional Activities

### 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 |
|---|---|---|
| 2021-22 | Reviewer | Natural Sciences and Engineering Research Council of Canada Discovery Grant Competition, Biological Systems and Functions |
| 2019-20 | Reviewer | Natural Sciences and Engineering Research Council of Canada Discovery Grant Competition, Biological Systems and Functions |

## Teaching

### 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

### Masters

| Years | Name | Program | Status |
|---|---|---|---|
| 2020- | Karishma Ramdeo | Kinesiology | In Progress |
| 2019-21 | Kristen DeMelo | Kinesiology | Completed |
| 2019-21 | Noah Erskine | Kinesiology | Completed |
| 2018-21 | 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

### 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 |
|---|---|---|---|---|
| 2022 | Vivian Li | Engineering | III | McMaster University |
| 2022 | Caroline Jarvi | Life Sciences | III | McMaster University |
| 2021 | Gurlal Gill | Kinesiology | III | McMaster University |
| 2021 | Anita Chaseendran | Life Sciences | III | McMaster University |
| 2021 | Gianna Jeyarajan | Life Sciences | IV | 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 | Victora 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 |
| 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]. [+]McKay B, **Carter MJ**. Data irregularities across six implicit learning articles: Comments on Lola, Giatis, Pérez-Turpin, and Tzetzis (2021), Lola and Tzetzis (2021), Lola and Tzetzis (2020), Tzetzis and Lola (2015), Lola, Tzetzis, and Zetou (2012), and Tzetzis and Lola (2010). *PsyArXiv*. doi: `https://doi.org/10.31234/osf.io/n8mab`

[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

[24.] [+]St. Germain L, [+]Williams A, [+]Balbaa N, [+]Poskus A, [+]Leshchyshen O, Lohse KR, **Carter MJ**. (in press). Increased perceptions of autonomy through choice fail to enhance motor skill retention. *Journal of Experimental Psychology: Human Perception and Performance*.

[23.] [+]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*.

[22.] [+]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.

[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**, [+]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**, [+]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**, [+]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

[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

**Presenting author(s)**; ⁺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**, ⁺McKay B, ⁺Williams A, ⁺Leshchyshen O, ⁺Poskus A, ⁺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**, ⁺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**, ⁺Williams A, ⁺Poskus A, ⁺Balbaa N, ⁺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**, ⁺Leshchyshen O, ⁺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**, ⁺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]. ⁺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, [+]Smail L, Wolpert DM, Gallivan JP, Flanagan JR. Gaze behaviour reveals the specification of competiting 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]. **[+]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, [+]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]. [+]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**, [+]Elnakouri A, [+]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, [+]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**, [+]Head CA, Puveendran P, Ste-Marie DM. Eliminating the learning benefits of self-controlled knowledge of results (KR) schedules: The improtance 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 replicaiton 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, Chiucchi 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**, [+]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**, **[+]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**, [+]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**, [+]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**, [+]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

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