Canadian Society for Brain, Behaviour and Cognitive Science

Société Canadienne des Sciences du Cerveau, du Comportement et de la Cognition

25th Annual Meeting Program

Carleton University, Ottawa, Ontario
June 5 to 7, 2015

Friday, June 5 events are co-sponsored by the Canadian Psychological Association (CPA).

www.csbbcs.org/2015

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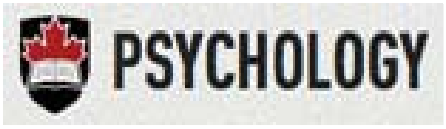
Sponsors

The organizing committee would like to thank all its sponsors for their contribution to this year's meeting.



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Welcome to the 2015 CSBBCS Meeting!

Carleton University is very excited to be your host for this year's CSBBCS meeting. We have planned many exciting events for you. The Friday, June 5 events will be held jointly with the Canadian Psychological Association Convention and will take place at The Westin Ottawa. These events will include a poster session and a keynote address by Dr. Elizabeth Phelps. All other traditional CSBBCS meeting activities including the Past President's symposium, the D.O. Hebb Award talk, the Early Career Award talk, the banquet, the regular symposia and the remaining poster sessions will take place at Carleton University, Saturday June 6 and Sunday June 7. We sincerely hope that you will enjoy all of our events. If there is anything that I or my committee can do for you to make your experience even better, please let us know.

Guy Lacroix and your 2015 CSBBCS Organizing Committee

Associate Organizer. Mark Brown
General organization. Mark Brown, Jordan Schoenherr, Tess Walsh, Robin Langerak, Kathleen Van Benthem, Dean Verger, Charles Collin, John Login, Jamie Grant, Lindsay Morgan
Program committee. Mark Brown, Jordan Schoenherr, Tess Walsh
Submission review committee. Mark Brown, Jordan Schoenherr, Tess Walsh, Andrew Hachey, Matt Martin, Craig Leth-Steesen, Véronique St-Onge
Welcoming committee. Lindsay Morgan, Chloe Slowikowski, Gina Hernandez, Ryan Pusiak, Jamie Grant, Vincent Leblanc.
Swag bag and gifts. Robin Langerak
Banquet organizer. Dean Verger
Downtown Social Event organizer. Jamie Grant, Miles Parkinson, and Chrissy Chubala
2015 CSBBCS materials design (Poster, program cover, and meeting badges). Chris Strangemore
Meeting website content. Robin Langerak and Kathleen Van Benthem
Website Maintenance. Trudy Shore, MohSho Interactive Multimedia, webmaster@csbbcs.org

General Information

Meeting Locations All Friday, June 5 events will be held at the Ottawa Westin (11 Colonel By Drive · Ottawa, Ontario, 613-560-7000). All Saturday, June 6 and Sunday, June 7 events will be held at Carleton University (1125 Colonel By Drive · Ottawa, Ontario, 613-520-2600). Please see the map on p. 6 to see both these locations.

Welcome table. When you first arrive at the meeting, please visit our Welcome table to pick up your meeting name badge, your swag bag, your program and your meeting gifts. Friday, the Welcome table will be located near the escalator in front of the Governor General Ballroom I at the Ottawa Westin. Saturday and Sunday, it will be in the Atrium of the River Building. Please see the maps on p. 7 and 9 to find these locations.

Did you know that we're on Twitter? Follow us at @OfficialCSBBCS and use the #CSBBCS2015 hashtag throughout the conference to connect with peers from all over Canada, and beyond! The CSBBCS is also on Facebook at https://www.facebook.com/CSBBCS.SCSCCC

Presentations

Poster Sessions. This year's meeting will hold four poster sessions. The first one will be held at the Ottawa Westin (Confederation Ballrooms II & III) and the last three will be at Carleton University (River Building 2220, 2224, and 2228). Please see the maps on p. 7 and 9 to find these locations.

Poster numbers are comprised of three digits: the first one indicates the poster session and the last two identify the board where you should set up your poster. We will be having two posters on each side of a poster board, organized horizontally. The boards are 96 inches by 48 inches tall. Posters should be no more than 48 inches wide, but can vary in height. Thumbtacks will be provided for mounting posters on the poster boards. Please post your poster in advance of the poster session start time. You may consult the short program starting on p. 22 and the long program starting on p. 52.

Symposia talks and general talks. All talks have been assigned a 15-minute time period. Hence, they should last approximately 12 minutes so that a 3 minute question period can follow. To allow meeting attendees to change sessions, we ask all our presenters to follow the schedule precisely. Talks will be held in the following Rooms: River Building 2200, University Centre 180, University Centre 182, and River Building 1200 (See the map on p. 9 and the back cover of this program to find these locations). Please consult the short program starting on p. 31 and the long program starting on p. 79.

Donald O. Hebb Graduate Student Awards. Submissions under consideration at this year's conference are denoted by an asterisk in the program.

Food & Fun

Cocktail Hour at the Ottawa Westin. Free hors d'oeuvres and a cash bar will be available after the Friday afternoon poster session in the Governor General Ballroom I.

Meals at Carleton. Three meals are included with your meeting registration: a BBQ lunch, Saturday, and a hot breakfast as well as a sandwich buffet, Sunday. There will also be a coffee break Saturday morning, Popcorn and pretzels snack Saturday afternoon, and a cash bar during the Saturday afternoon poster session. All food will be offered in the Atrium of the River Building (See the map on p. 9). Vegetarian options will be available.

Banquet. The banquet will take place in the Residence Commons (Room 270). Only members who have pre-registered online for this event can participate. Our hosts will be greeting participants and will have a guest list. Hence, there will be no need for tickets.

The cash bar will open starting at 6 pm and the dinner service will start around 7 pm. A variety of Hors d'oeuvres will be available while guests arrive and the menu will include:

- Apple and Pear Red Endive Salad with local Goat Cheese, Herbed Parmesan Chips and Raspberry Vinaigrette
- Stuffed Supreme of Chicken with Black Olive Sun-Dried Tomato Tapenade, Opal Basil and Feta Cheese, served with Roasted Red Jacket Potatoes and Seasonal Julienne Vegetables glazed with Red Port Veal Glace (A vegetarian option will be served to members who requested it)
- Chocolate Baba soaked in Rum Sugar with Crème Anglaise; and coffee or tea.

Complimentary red wine, white wine, and soft drinks will be served with the meal. Finally, live music for this evening will be provided by Terry Tufts and Kathryn Briggs.

Saturday Evening Downtown Social Event. Saturday Evening Downtown Social Event. The meeting point will be D'Arcy McGee's (44 Sparks Street near Elgin – a 2 minute walk from Parliament Hill). Jamie Grant, Miles Parkinson, and Chrissy Chubala will be expecting you there at 7 pm. Then, the plan is to visit the Heart and Crown in the Byward Market (67 Clarence St) around 8:30 to 9 pm and Patty Boland's Irish Pub & Eatery (101 Clarence St) also in the Byward Market around 11 pm. The organizers will facilitate your access to these venues if you have pre-registered for this event only.

NSERC Discovery Grant Meeting (Sunday from 8:30 to 9:30 – River Building 2200). NSERC Program Officer for Research Grants and Scholarships, Guillaume Sabourin, will offer a two-part presentation. The first portion will concentrate on program news and the latest Discovery Grant competition results with a focus on those from the Life Sciences Evaluation Groups (i.e., those most pertinent to Behavioural Neurosciences or Cognitive Sciences). The second part will provide information on "how to apply" to the Discovery Grant Program. Guillaume will also be available to answer all your NSERC-related questions.

Transportation & Miscellaneous

Getting from downtown Ottawa to Carleton and back. Arguably, the best way to get from downtown Ottawa to Carleton (and back) is to take a cab especially if you share it with other people. Here are a few companies: Blue Line: 613-238-1111, Capital Taxi: 613-744-3333
DJs Taxi: 613-829-9900; 613-829-9011

Public transportation is also available. OC Transpo Bus #4 toward Rideau Centre and #7 toward St-Laurent both make it to the Rideau Centre (next to the Ottawa Westin). Please see the map on p. 8 for bus-stop locations.

Parking. Parking at the Ottawa Westin is $35 per day. There are many nearby parking lots that are less expensive, however. Parking at Carleton can be purchased on a daily basis from a number of Pay and Display machines. Events will take place in the River Building and the University Centre. Hence, your best choice for parking is lot P2 (See the Campus Map on page). Weekend parking costs $4 per day.

Wireless Internet Access. All meeting attendees have free internet access in both the River Building and the University Centre. The Wireless Network (SSID) is CSBBCS and the password is carleton2015.

Smoking. Smoking is not permitted in any building on campus. Smoking areas are designated with signs.

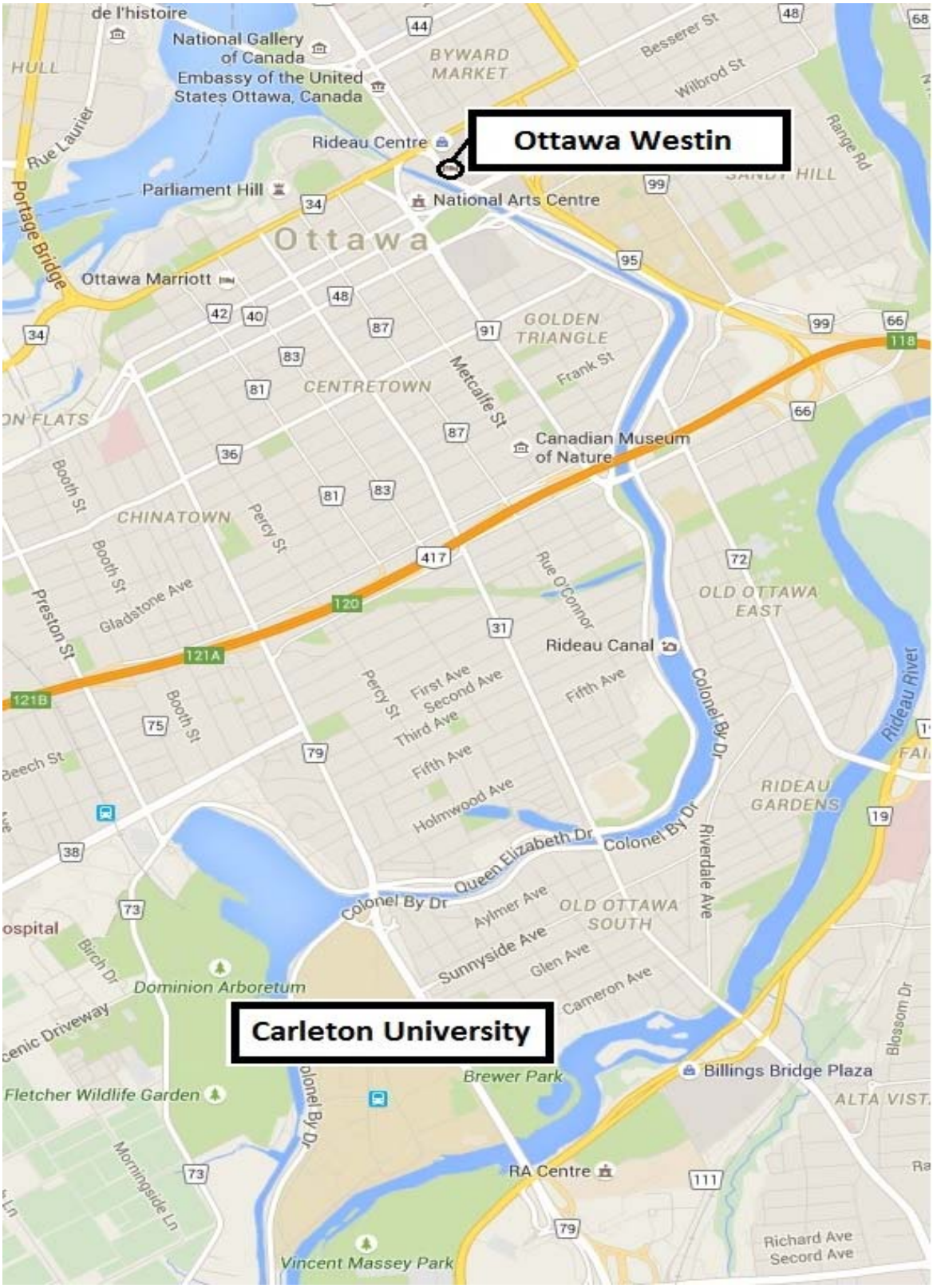
Need a break from the talks and posters?

Saturday, June 5 Carleton Professor Chris Herdman will offer a tour of his laboratory: The Advanced Cognitive Engineering Laboratory (ACE Lab).

The mission of the ACE Lab is to discover fundamental principles of human perception and cognition and to apply these principles to the design, implementation and evaluation of advanced human-machine systems. In recent years, the lab has focused on a variety of research questions including how age-related changes in cognitive functioning affect performance and flight safety in recreational pilots; how spatial working memory mediates the impact of motion-cueing systems in flight training; how cell phone conversations may lead to driver distraction; and how computer based training systems can enhance Air Search and Rescue training programs. The tour will allow you to see a number of helicopter (Cormorant and Bell 206) and fixed-wing (Cessna 172) flight simulators.

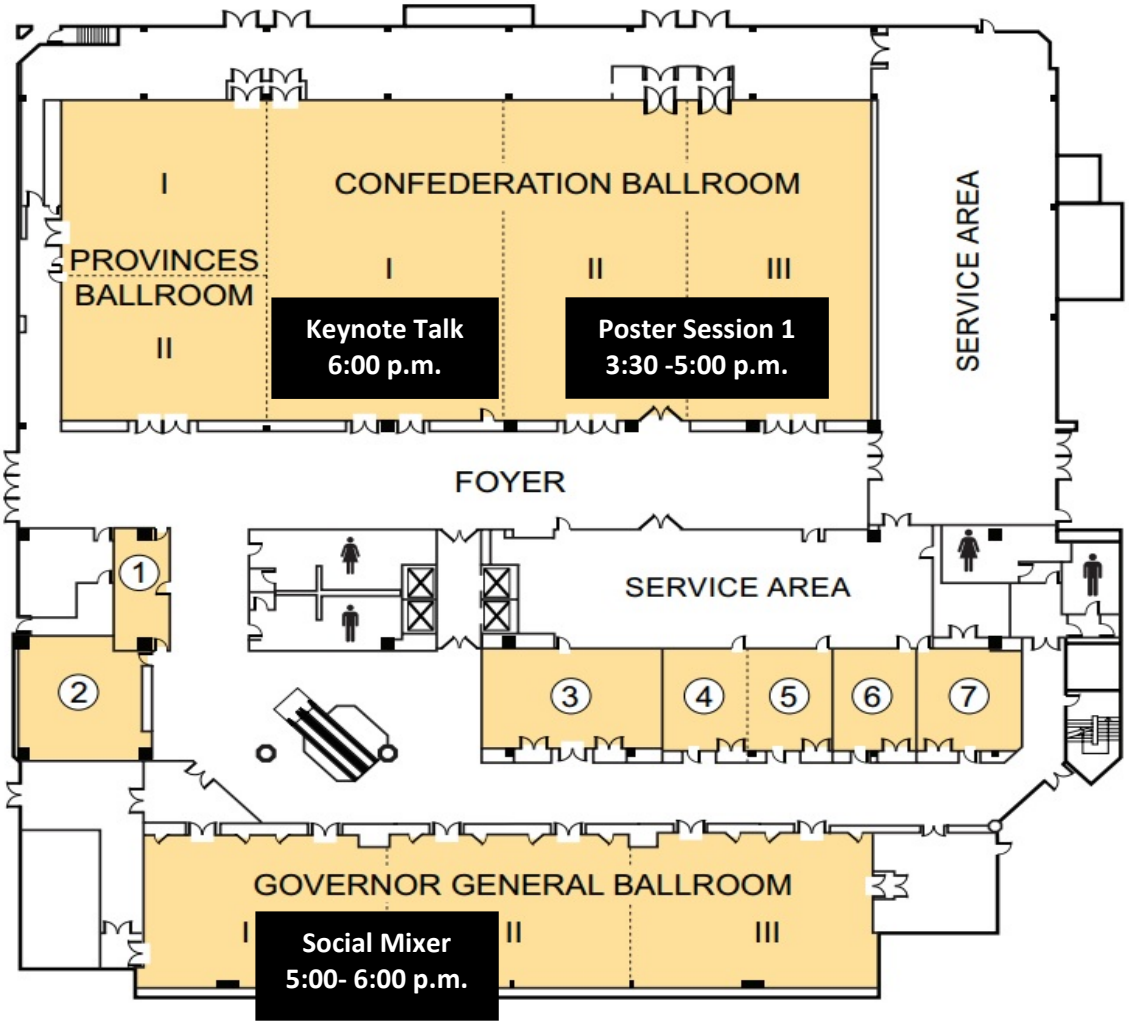
If you are interested, please arrive at the Welcome table (in the Atrium of the River Building) around 4:30. Members of Dr. Herdman's lab will greet you there. The tour will last approximately one hour.

Maps

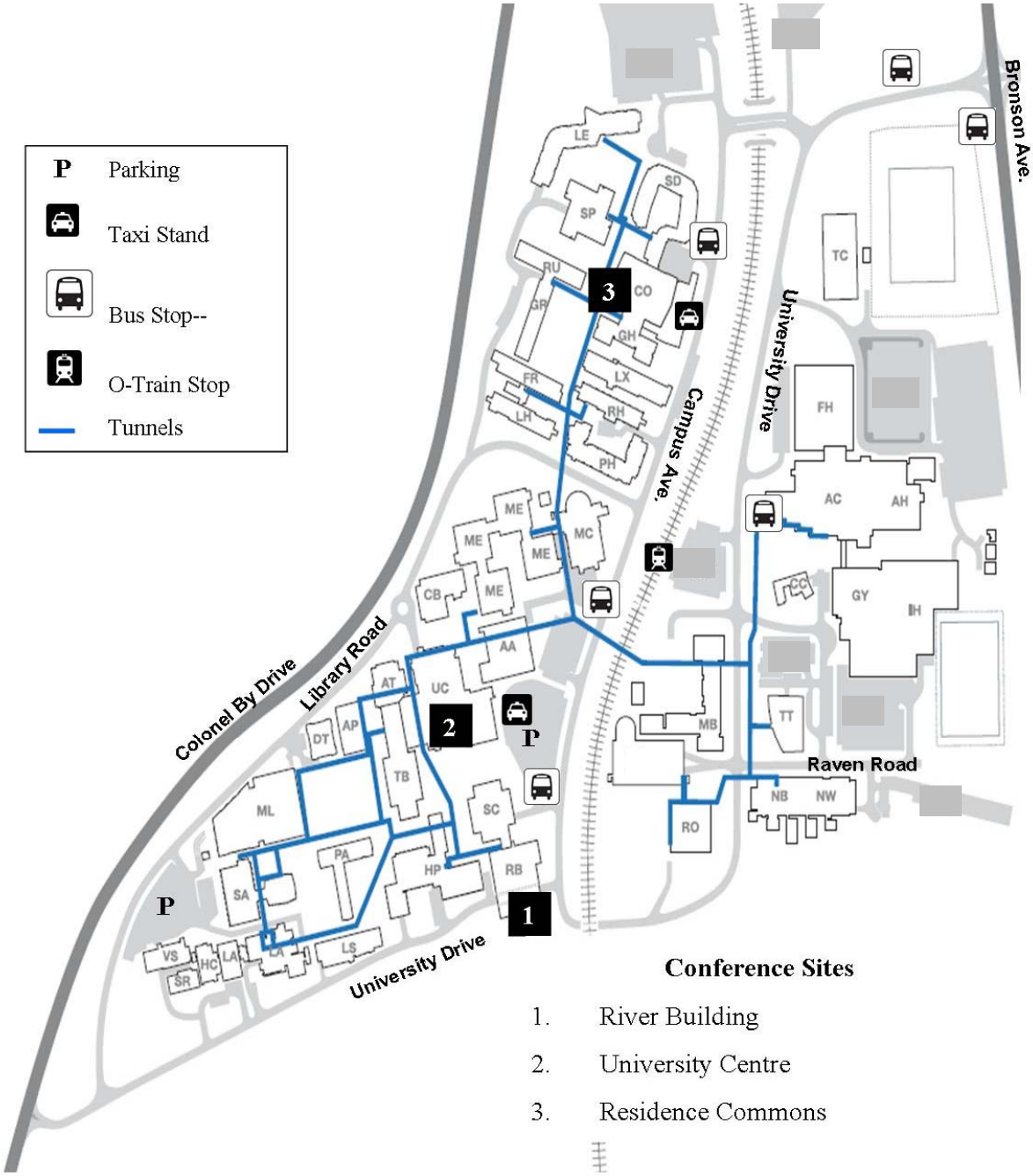

Ottawa Westin
Carleton University
de l'histoire
National Gallery of Canada
Embassy of the United States Ottawa, Canada
HULL
BYWARD MARKET
Besserer St
Wilbrod St
Rue Laurier
Rideau Centre
Range Rd
Parliament Hill
National Arts Centre
SANDY HILL
Portage Bridge
Ottawa
Ottawa Marriott
GOLDEN TRIANGLE
Frank St
CENTRETOWN
Metcalfe St
Canadian Museum of Nature
ON FLATS
Booth St
CHINATOWN
Percy St
Gladstone Ave
Preston St
Rue O'Connor
OLD OTTAWA EAST
Rideau Canal
First Ave
Second Ave
Third Ave
Fifth Ave
Holmwood Ave
Colonel By Dr
Rideau River
RIDEAU GARDENS
Queen Elizabeth Dr
Riverdale Ave
Aylmer Ave
OLD OTTAWA SOUTH
Sunnyside Ave
Glen Ave
Cameron Ave
Dominion Arboretum
Birch Dr
Fletcher Wildlife Garden
Brewer Park
Billings Bridge Plaza
Blossom Dr
ALTA VISTA
RA Centre
Morningside Ln
Vincent Massey Park
Richard Ave
Secord Ave

Westin Hotel

(11 Colonel By Drive - Downtown)



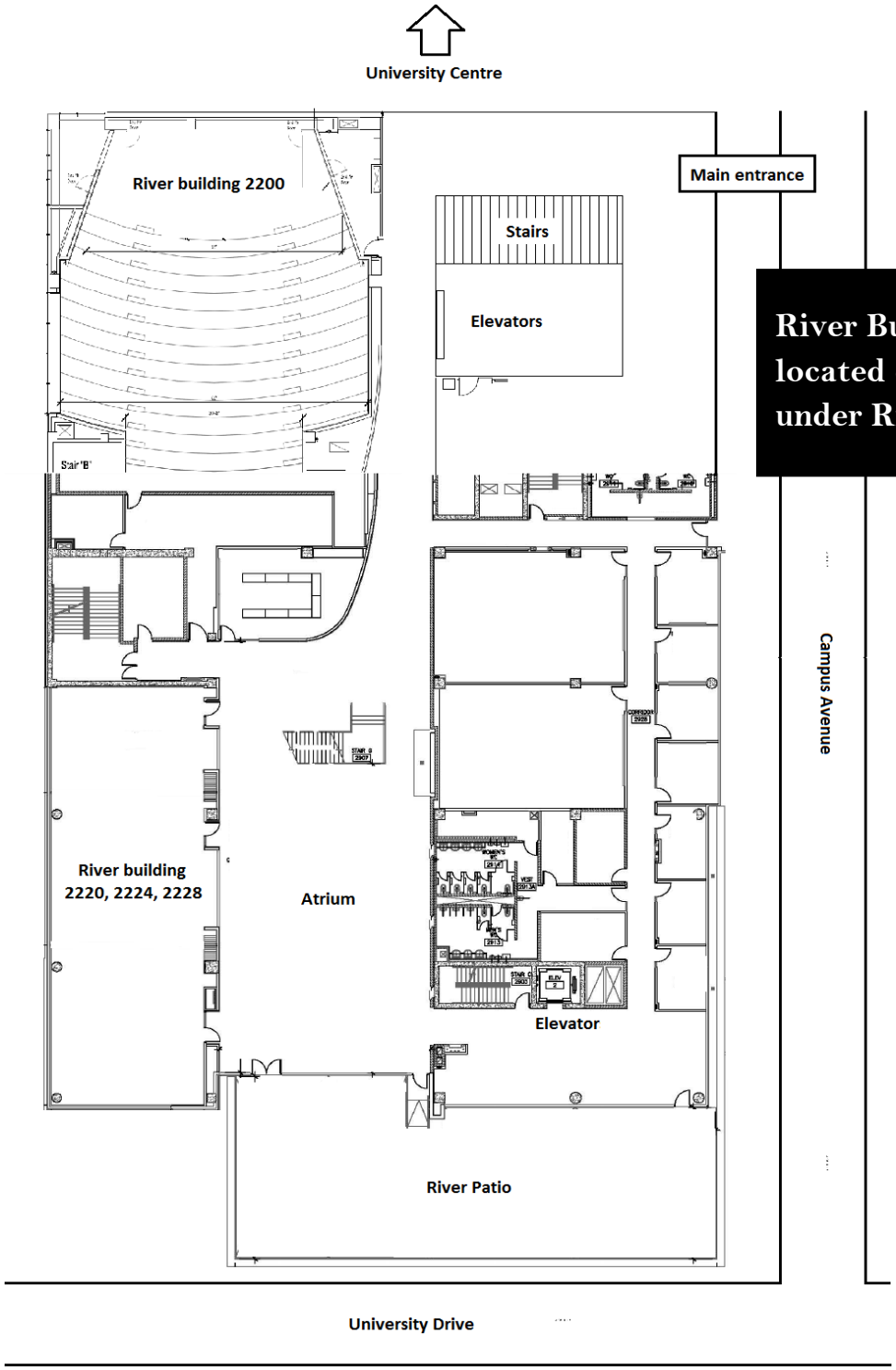
Carleton UNIVERSITY CAMPUS MAP



Conference Sites

1. River Building
2. University Centre
3. Residence Commons

Carleton University: River Building



River Building 1200 is located on the first floor under River Building 2200

2015 CSBBCS Meeting Program at a Glance

Friday, June 5 – Carleton University

8:00 a.m to 2:00 p.m. Pre-conference event - Introduction to Programming in R
(Registration for this event is mandatory in order to participate)

Friday, June 5 – The Westin Ottawa

2:00 p.m. Registration (near escalator in front of Govenor General Ballroom I)

3:30 to 5:00 p.m. Poster session #1

5:00 to 6:00 p.m. CPA/CSBBCS Social Mixer

6:00 to 7:00 p.m. CPA/CSBBCS Keynote Talk – Dr. Elizabeth Phelps

Saturday, June 6 – Carleton University

8:00 a.m. Registration (Ongoing)

9:00 to 9:30 a.m. CSBBCS 2015 Welcome and Award Ceremony

9:45 to 10:15 a.m. Early Career Award Talk

10:15 to 10:30 a.m. Nelson Education coffee break

10:30 to 11:30 a.m. D.O. Hebb Award Talk

11:30 to 12:55 p.m. Poster session #2 – Carleton Department of Psychology Lunch

1:00 to 4:30 p.m. Concurrent Symposium Sessions

3:15 to 3:30 p.m. Pearson pretzels and popcorn break

4:30 to 6:00 p.m. Poster session #3

7:00 p.m. Carleton Faculty of Arts and Social Sciences Banquet / Downtown Social Event
(Registration is mandatory to participate in these events)

Sunday, June 7 – Carleton University

8:00 to 9:30 a.m. Carleton Institute of Neuroscience Breakfast and NSERC Discovery Grant Meeting

9:30 to 11:30 a.m. Past President's Symposium

11:30 to 12:45 p.m. Poster session #4 – Carleton Institute of Cognitive Science Lunch

12:50 to 4:30 p.m. Concurrent Colloquium Sessions

4:45 to 5:45 p.m. CSBBCS Business Meeting

CSBBCS/CPA CJEP Best Article Award

The CPA and CSBBCS collaboratively publish The Canadian Journal of Experimental Psychology (CJEP). The journal publishes original research papers that advance understanding of the field of experimental psychology, broadly considered. This includes, but is not restricted to, cognition, perception, motor performance, attention, memory, learning, language, decision making, development, comparative psychology, and neuroscience.

As part of their respective mandates, the CPA and the CSBBCS are committed to promoting excellence and innovation in psychological science, according to the highest standards of scientific inquiry, and disseminating psychological knowledge to their members and the broader external community via a variety of means including but not limited to newsletters, electronic newsletters, and annual meetings. In keeping with these aims, the CSBBCS and the CPA co-sponsor an annual award for the best article published in the Canadian Journal of Experimental Psychology.

The 2015 award will be presented to Ian Neath, first author of the paper:

Neath, I., VanWormer, L. A., Bireta, T. J., & Surprenant, A. M. (2014). From brown-peterson to continual distractor via operation span: A SIMPLE account of complex span. *Canadian Journal of Experimental Psychology/Revue Canadienne De Psychologie Expérimentale, 68*, 204-211. doi:http://dx.doi.org/10.1037/cep0000018.

Abstract

Three memory tasks—Brown-Peterson, complex span, and continual distractor—all alternate presentation of a to-be-remembered item and a distractor activity, but each task is associated with a different memory system, short-term memory, working memory, and long-term memory, respectively. SIMPLE, a relative local distinctiveness model, has previously been fit to data from both the Brown-Peterson and continual distractor tasks; here we use the same version of the model to fit data from a complex span task. Despite the many differences between the tasks, including unpredictable list length, SIMPLE fit the data well. Because SIMPLE posits a single memory system, these results constitute yet another demonstration that performance on tasks originally thought to tap different memory systems can be explained without invoking multiple memory systems.

2015 CSBBCS Early Career Award Winner

Dr. Evan F. Risko is a Canada Research Chair and Assistant Professor in the Psychology Department at the University of Waterloo. He received his Ph.D. from the University of Waterloo with Drs. Jennifer Stolz and Derek Besner and was a Killam and NSERC Postdoctoral Fellow at the University of British Columbia with Dr. Alan Kingstone. He began his career as a faculty member at Arizona State University, then moved to the University of Memphis before finally returning home to the University of Waterloo in 2013. Dr. Risko's early research touched on a number of topics including visual attention, reading, and cognitive control. Recent projects in his Cognition and Natural Behavior Laboratory have focused on understanding how we use our body and the physical/social environment to help us think and how this coupling ultimately shapes our thinking. He is also interested in issues related to "ecological validity" and, relatedly, in translating basic research into more applied domains. With respect to the latter, this has included a number of studies investigating attention in educational contexts.

Dr. Risko has published over 40 papers in a variety of journals including Cognition, Journal of Experimental Psychology: Human Perception and Performance, Journal of Experimental Psychology: Learning, Memory and Cognition, Cognitive Science, Psychological Review, Journal of Educational Psychology, and Applied Cognitive Psychology amongst many others. In the broader community, his work has been well received both nationally and internationally, having been featured in such news outlets as TIME, the Globe and Mail, CTV, and NPR. He has received funding for his research from NSERC, SSHRC, the Canadian Foundation for Innovation, the Ontario Research Fund, and the Canada Research Chairs program. Dr. Risko has been awarded a number of accolades throughout his career including two Alumni Gold Medals as a graduate student at the University of Waterloo and a number of conference presentation awards including a Donald O. Hebb Graduate Student Poster Award from the Canadian Society for Brain, Behavior and Cognitive Science in 2006. Finally, Dr. Risko has a deep passion for mentoring students and takes great joy in the successes of the undergraduate and graduate students working in his laboratory.

Early Career Award Talk

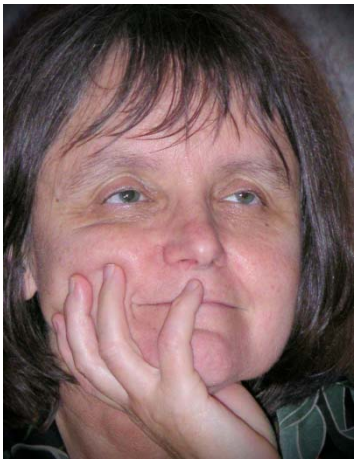
Saturday June 6 2015
9:45 – 10:15 a.m.
Room 2200 River Building

Toward a Cognition of Avoiding Cognition: Understanding Cognitive Offloading

Evan F. Risko, *University of Waterloo*

Abstract. A moment's reflection on our day-to-day lives reveals that people often think with their body and/or the objects in their physical environment. For example, we tilt our heads while trying to perceive an ambiguous image, gesture while imagining spatial transformations (e.g., what would this object look like rotated?), and rely on technology to store and search for information (e.g., smartphones). This interaction between internal/mental processes and external processes represents a fundamental characteristic of human cognition. A staple example of this kind of interaction is cognitive offloading - the use of the body and/or physical environment in place of internal processing. In this talk, I will review some of our work examining this behavior. In particular, I will discuss research investigating how we decide to offload when the opportunity is available to us and how this opportunity can influence how we think. Together we think this research is beginning to provide us with a deeper understanding of how we use our body and physical environment to help us think and how this coupling ultimately shapes our thinking.

2015 Donald O. Hebb Distinguished Contribution Award



Daphne Maurer received her Ph.D. from the University of Minnesota and has been at McMaster University since 1973. She is a Fellow of both the Royal Society of Canada and the Association for Psychological Science, and she has been awarded the title "Distinguished University Professor" by McMaster. Throughout her career she has studied how perception develops and matures, concentrating on the visual system and beginning at birth. Her work has reshaped our understanding of the infant's sensory world and its development, and has improved clinical care.

Daphne began with the basics: how newborn and older babies move their eyes across a scene and what elements of a scene they see. She measured vision from minutes after birth, establishing not only that newborns can see but that they have some rudimentary colour vision and a preference that pulls them toward faces. From there she went onto measure developmental changes in sensitivity to contrast, orientation, form, motion, emotional expressions, facial identity, and information in the periphery. She is currently examining how children integrate visual, auditory and tactile information into unified percepts, both in typical children and those identified as synaesthetes.

In the 1980s Daphne started a parallel line of research at Toronto's Hospital for Sick Children. Each year ophthalmologists there operate on a small number of babies who are born with dense cataracts in one or both eyes. For 20 years Daphne tested these babies soon after the cataracts were removed, and she has since followed them into adulthood. This has been the first and only long-term study of the effects of early visual deprivation on human beings. Its uniqueness and clinical significance were recognized by the United States' National Institutes of Health, which made the unusual decision to fund the project for 14 years although the research was done in Canada.

The results of this research have been profound. Daphne learned that abnormal vision early in life harms not just low-level functioning like acuity and binocular vision but also cortical processing that affects the perception of motion and the perception of complex forms like faces. In consequence of this, surgery for congenital cataracts is no longer delayed for months or years until convenient, it is done as soon after birth as possible.

This research also showed that normal development of the visual cortex does not stop at age five, as used to be thought, but extends well into adolescence. A clinical implication is that cortical dysfunction may be treatable later in life than used to be thought possible. To test this, Daphne proposed to the James S. McDonnell Foundation a research programme comparing cortical plasticity

in adult humans and animals, with the goals of finding a treatment for the most common cortical visual problem of adults: amblyopia (lazy-eye). This resulted in the establishment for five years of an international team of scientists, led by Daphne and funded by a US$2.5M grant. They succeeded in documenting an effective adult treatment.

In all of her work Daphne has shown how developmental changes in perception are linked to developmental changes in the brain. For this reason her experimental methods and stimuli have been adopted by researchers around the world who are investigating the effects on perception of autism spectrum disorder, Williams Syndrome, congenital deafness, brain lesions, premature birth, prenatal exposure to lead, and normal aging. Moreover, although much of her research has been inspired by animal models, it has inspired animal research in turn.

Outside the lab Daphne radically altered most notions of the baby's perceptual world with The World of the Newborn. This book deduces from experimental evidence the perceptual, cognitive, and emotional world of the newborn, and derives implications for optimal child rearing. It won the American Psychological Association's book award and has been translated into five languages.

Administratively Daphne has contributed to Canadian science by serving not just on scientific advisory panels but also on committees defining and implementing ethical policies for research involving human subjects, at the national level as well as at McMaster.

2015 Donald O. Hebb Award Talk

Saturday June 6, 2015
10:30 – 11:30 a.m.
Room 2200 River Building

How the Baby Learns to See
Daphne Maurer, *McMaster Univeristy*

Abstract. In 1949, Donald Hebb outlined a radical theory of how organisms learn to perceive the world in his book *The Organization of Behavior*. I shall re-evaluate Hebb's ideas in light of my 35 years of research on how visual development is affected when babies are visually deprived at birth but have their vision restored. Most of the findings support Hebb's ideas about how experience drives development but recent evidence of unexpected plasticity in the adult brain requires an alternative explanation.

Science and Applications Keynote Address

Co-sponsored by the CPA and the CSBBCS

Friday June 6, 2015

6:00 – 7:00 p.m.

Westin Hotel: Confederation I - 4th Floor

Dr. Elizabeth Phelps, Julius Silver Professor of Psychology and Neural Science (Department of Psychology, New York University), will give the Science and Applications Keynote Address at the CPA's 76th Annual Convention in Ottawa, ON on Friday June 5th at 6pm. This year's Science and Applications Plenary Session is being co-sponsored by the Canadian Psychological Association (CPA) and the Canadian Society for Brain, Behaviour and Cognitive Science (CSBBCS).

Changing Fear

Dr. Elizabeth Phelps, *New York University*

Abstract. Animal models of fear learning provide a basis for understanding human fears. This research has demonstrated that the amygdala is necessary for the acquisition, storage and expression of fear learning. This talk will explore how the neural mechanisms identified in animal models are consistent with human brain function and extend this research to the complex learning situations more typical of human experience. I will first describe how the mechanisms of simple associative fear learning extend to the social acquisition of fear in humans. I will then focus on how fear, once acquired, can be diminished. Extinction and emotion regulation, techniques adapted in cognitive behavioral therapy, can be used to control fear via inhibitory signals from the ventromedial prefrontal cortex to the amygdala. One drawback of these techniques is that fears are only inhibited and can return, with one factor being stress. A more lasting means to control fear may be to target the fear memory itself through influencing reconsolidation. I will present evidence suggesting that the behavioral interference of reconsolidation in humans persistently inhibits fear and diminishes involvement of the prefrontal cortex inhibitory circuitry.

Past President's Symposium

Sunday June 7, 2015

9:30 – 11:30 a.m.

Room 2200 River Building

Each year, CSBBCS's past president has the privilege of organizing a symposium for the pleasure of all meeting attendees. This year, Penny Pexman's symposium is entitled: Recent Advances in Language Development Research: Reading, Writing, and Bilingualism. Penny says:

"In recent years we have seen some exciting advances in our understanding of language acquisition. In this symposium, we highlight some of the latest research on the developing language system, and how it is shaped by factors such as bilingualism and the acquisition of reading and writing skills. This research includes behavioural and also neuroimaging work, and offers insights about how individual variability in language acquisition can reveal important similarities in underlying mechanisms."

-Talk 1-

Same Dough, Different Oven: Bilingual-Monolingual Similarities in Infancy are as Informative as Dissimilarities.

Christopher T. Fennell
School of Psychology and Department of Linguistics
University of Ottawa

"Everyone is kneaded out of the same dough but not baked in the same oven." – Yiddish proverb. There has been a veritable explosion of research on bilingual infants' language development over the past decade. Unsurprisingly, differences between bilingual and monolingual language development have garnered much attention. While there are some interesting developmental differences between the two groups, a growing amount of research demonstrates that monolinguals and bilinguals share common linguistic processes and language milestones. I will focus on two areas of infant language development, phonology and word learning, to highlight the similarities and dissimilarities between monolingual and bilingual development. Using recent data from my own lab and others, I will discuss how similar language processes can (and should) account for monolingual and bilingual language acquisition. Further, I will show that even apparent behavioural differences between the two populations may, in fact, reveal underlying similarities in their language processing.

-Talk 2-

How Handwriting Experience Changes Visual Letter Processing in the Pre-Literate Brain

Karin H. James
Psychological and Brain Sciences
Indiana University

One of the best predictors of reading acquisition in elementary school is letter knowledge in pre-school. Nonetheless, we know very little about how letters are learned and the neural substrates and circuitry that underlie typical and atypical letter learning. Our functional Magnetic Resonance Imaging research has transformed our understanding of letter learning by showing that letter 'reading' by pre-school children recruits the same neural substrates that are used for word reading in adults – but, of key importance, only if the pre-schoolers have previous experience printing letters by hand. This same adult network was not recruited for letter reading when pre-schoolers practiced letters through typing, tracing, or seeing/hearing. Further, another key outcome has been that functional neural connections between the sensory/visual 'reading' network and fine motor-control networks are enhanced with handwriting practice, but not other forms of practice, suggesting that the mechanism for development to an adult-like reading network involves sensorimotor plasticity that may be optimized during printing. Thus, these studies suggest a crucial role for handwriting in the development of reading systems in the brain. Current and future work is addressing how sensorimotor connectivity is created through handwriting – that is, what aspect of the writing experience changes letter processing. Preliminary data suggests that the variability of self-generated visual input produced during handwriting (the variable written letter form) may be the key to the effectiveness of handwriting over other learning modalities. These studies are the first to explore how handwriting affects letter processing and why this effect occurs.

-Talk 3-

Gray- and White-Matter Correlates of Individual Differences in Reading and Second Language Learning

Marc F. Joanisse
Department of Psychology & Brain and Mind Institute
The University of Western Ontario

Modern neuroimaging has allowed us to closely identify brain regions supporting spoken and written language. Yet, because these findings are usually derived from averaging across many subjects, much less is known about how these findings vary on an individual basis. In this talk I discuss some current research in my lab that explores individual differences in brain networks supporting reading and language, using functional MRI and diffusion tensor imaging. First, I explore the extent to which readers vary in their general skill level and their use of different reading sub-skills. I show how it is possible tie these differences to the engagement of, and connectivity among, distinct subregions of the brain's reading network. Next, I examine how bilinguals vary in their age of acquisition and degree of proficiency of their second language. We trace both these sources of variability to complementary grey and white matter regions, suggesting multiple factors influence second language learning success. Overall, our results illustrate how focusing on individual differences can be useful for understanding neural organization.

CALLING ALL PSYCHOLOGY GRADUATES!

The CPA is calling on EVERYONE across the country who has EVER completed a MASTER'S or DOCTORAL degree in ANY AREA of psychology to complete the 2015 Psychology Graduate Survey.

The survey is open to anyone with a Canadian psychology connection – i.e., if at any point you have studied and/or worked in Canada. You don't have to be a registered psychologist; you don't have to work in a psychology related area; you can be unemployed, retired, at home or on parental leave. As long as you have completed a graduate degree in psychology, you are eligible to take part. To complete the survey, simply scan the QR code below, enter the website address into your browser, or visit one of the computer stations throughout the convention floors. Please ensure your voice is counted!

http://goo.gl/DzQyE7

Condensed Program

Friday June 5, 2015

8:00 a.m. - 2:00p.m.	**Pre-Conference Event: Programming in R** University Centre 182
2:00 – 3:30 p.m.	Break
3:30 – 5:00 p.m.	**Poster Session 1** **Westin Hotel** Confederation II-III
5:00 – 6:00 p.m.	**CPA/CSBBCS Social Mixer** Westin Hotel Governor General Ballroom I – II
6:00 – 7:00 p.m.	**Joint CPA/CSBBCS Keynote Talk** Dr. Elizabeth Phelps Westin Hotel Confederation I

Saturday June 6, 2015

8:00 a.m. (Ongoing)	**Registration** River Building (Atrium)
9:00 – 9:30 a.m.	**CSBBCS 2015 Welcome and Awards Ceremony** River Building (2200)
9:30 – 9:45 a.m.	Break
9:45 – 10:15 a.m.	**Early Career Award Talk** Evan F. Risko River Building (2200)
10:15 – 10:30 a.m.	Nelson Education Coffee Break
10:30 – 11:30 a.m.	**D. O. Hebb Award Talk** Daphne Maurer River Building (2200)
11:30 – 12:55 p.m.	**Poster Session 2** River Building 2220, 2224, 2228 Carleton Department of Psychology Lunch
12:55 – 1:00 p.m.	Break

Saturday June 6 continued				
Symposium Sessions				
	UC (180)	**UC (182)**	**River (2200)**	**River (1200)**
1:00 – 2:00 p.m.	Embodied Cognition Evan Risko	Probing the Link Between Brain and Behavior with Optogenetics Matthew Holahan	Reading Words for Meaning: Semantics and Morphology (Part 1) Stephen Lupker	Models of Cognitive Processing: Implications for Clinical Reasoning and Decision Making in Medicine Timothy Wood
2:00 – 2:15 p.m.	Break			
2:15 – 3:15 p.m.	Processes in Numerical Cognition Jo-Anne LeFevre	Mechanisms of Selective-Attention in the Normal and Concussed Brain: Evidence from Human Electrophysiology Talia Losier	Reading Words for Meaning: Semantics and Morphology (Part 2) Stephen Lupker	Aviation Psychology Chris Herdman
3:15 – 3:30 p.m.	Pearson Pretzel and Popcorn Break			
3:30 – 4:30 p.m.	Predictors of Children's Early Mathematical Development Erin Anne Maloney	Perception of Self-Motion Shannon O'Malley	Language Comprehension and Representation Murray Singer	Interactive Social Cognition: An Emerging Science Elina Birmingham
4:30 – 6:00 p.m.	**Poster Session 3** River Building 2220, 2224, 2228			
6:00 – 7:00 p.m.	Break			
7:00 p.m.	**Carleton Faculty of Arts and Social Sciences Banquet** Residence Commons (Room 270). **Pub Crawl** Downtown ByWard Market (Registration is mandatory to participate in these events)			

Sunday June 7, 2015

8:00 – 9:30 a.m.	**NSERC Discovery Grant Meeting and Carleton Institute of Neuroscience Breakfast** River Building 2200			
9:30 – 11:30 a.m.	**Past President's Symposium** **Penny Pexman** River Building 2200			
11:30 – 12:45 p.m.	**Poster Session 4** River Building 2220, 2224, 2228 Carleton Institute of Cognitive Science Lunch			
12:45 12:50 p.m.	Break			

Colloquium Sessions

	UC (180)	**UC (182)**	**River (2200)**	**River (1200)**
12:50 – 2:05 p.m.	Cognition I	Memory I	Neuroscience I	Cognition and Applications I
2:05 – 2:15 p.m.	Break			
2:15 – 3:15 p.m.	Cognition II	Memory II	Developmental	Perception
3:15 – 3:30 p.m.	Break			
3:30-4:30 p.m.	Cognition and Applications II	Language	Neuroscience II	Cognition III
4:30 - 4:45 p.m.	Break			
4:45 – 5:45 p.m.	CSBBCS Business Meeting River Building 2200			

Poster Session 1

Friday June 5th 3:30 – 5:00 p.m.
Westin Hotel (Confederation II-III)

100 Age-related Differences in the Effect of a Sad Mood Induction on Attention to Emotional Information
Calandra Speirs, Amanda Fernandez, Kristin Newman, Christopher Roy Sears

101 Is being thankful more than just good manners? Dispositional gratitude and attentional bias
Brian M Bird, Christian LaForge, Ryan Ferguson, Annie Roy-Charland, Fuschia Sirios

102 Females search, males find: The effect of a distractor face on search depends on gender
Dana A Hayward, Alexa Meilleur, Laura Andreea Seusan, Jelena Ristic

103 Sex Differences While Viewing an Erotic Video
Lucia Farisello, Jacob Applebaum, Karine Elalouf, Jim G. Pfaus, Aaron P. Johnson

104 An Analysis of the Effects of Masculinized and Feminized Male Voices on Men and Women's Distractibility and Implicit Memory
Graham Olivier-Ross Albert

105 Enhanced Local Processing in Autism: Evidence from Eye-tracking Dynamic Events
Deborah Anne Kathryn Martin, Roberto G. de Almeida

107 A dual-process model of moral judgment: What psychopaths can tell us about morality
Deirdre Kelly, Jim Davies

108 Low Voice Pitch Predicts Sociosexual Attitude in Women
Sari Genny, Elana Isenstein, Kelyn Jeanette Montano, David Russell Feinberg

109 Non-literal language and social cognition: A developmental relationship
Ashley Toohey, Nancie Im-Bolter

110 Touching versus looking: The influence of different kinds of sensorimotor experience in children's word learning
Michele Wellsby, Penny M Pexman

111 Response Set or Semantic Relation: Preschoolers' Performance on Three Stroop Tasks
Corrie Vendetti, Katherine Andrews, Andrea Astle, Alicia Bartlett, Deepthi Kamawar

112 Improvements in Counting Speed in relation to Visual-Spatial Processes
Chunyun Ma, Chang Xu, Matthew Gerald Huebner, Elizabeth Schultheis, Andrea Howard, Jo-Anne LeFevre

113 Attentional Switching in Bilingual and Monolingual Infants: An Eye Movement Study
Mahta Kakvan, Audrey Wong Kee You, Scott Adler, Ellen Bialystok

114 Knowledge of semantic features in mild cognitive impairment
Anna Voronchikhina, Gillian Gorfine, Matthew Lukasik, Vanessa Tale

115 Phonological Processing and Executive Function Differentially Modulate Reading Comprehension Deficits in Schizophrenia and Developmental Dyslexia
Veronica Whitford, Nicholas Ostapchuk, Debra Titone, Gillian A. O'Driscoll

116 Give me a verb! Give me a noun!: An ERP investigation of perceptual words with ambiguous word classes
Ryan Ferguson, Justin Chamberland, Joël Dickinson

117 Arbitrariness Isn't Set in Concrete: The Sound Symbolism of Concreteness
David Michael Sidhu, Penny Pexman

118 The Impact of Text Difficulty on the Missing-Letter Effect
Christian LaForge, Danielle Vien, Danielle Julie Marie Huot, Annie Roy-Charland

119 Examination of question dependency in standardized reading comprehension tests
Annie Roy-Charland, Caroline Comeau, Leila Reguigui

120 The Impact of Familiarization Strategy on the Missing-Letter Effect
Joannie Quenneville, Andréanne Plamondon, Annie Roy-Charland, Justin Chamberland, Julia Lavallée

121 The Effect of Diacritic Marking on the Speeded Visual Recognition of French Nouns
Audrey-Ann Deneault, Alain Desrochers

122 Tip-of-the-Tongue States: The Role of Repeated Information in The Error Repetition Effect
Kathleen Oliver, Karin R. Humphreys

123 Heuristic mechanisms in sentence processing
Veena D Dwivedi, Leslie Rowland, Kaitlin Curtiss

124 The Impact of Clef, Pitch and Frequency of Occurrence on Visual Note Identification
Éva Nadon, Audrey-Ann Deneault, Alain Desrochers

125 The Effects of Stimulus Quality on Reading Aloud: A New Dissociation
Darcy White, Derek Besner

126 Lexical processing of skipped words in reading
Andreanne Plamondon, Jean Saint-Aubin

127 Orthographic Knowledge in Beginning Spellers
Derrick Charles Bourassa, Harriet Winterflood

128 Speech sound regularities: Adults track syllable position and co-occurrence information
Amélie Bernard, Kristine H. Onishi

129 The Effect of Sense Relatedness in Older Adults and Patients with Mild Cognitive Impairment or Early Alzheimer's Disease using Event-Related Potentials
Kyra Nicholson, Rocío López Zunini, Vanessa Taler

130 Linguistic Learning Simulation Using Associative Neural Networks: A Context-Free Study
Raphaelle Robidoux, Sylvain Chartier, Alain Desrochers

131 The effects of writing disfluency on lexical features of essays
Srdan Medimorec, Evan F. Risko

132 Recognition of foreign phonemic sequences by pre-adolescents, adolescents and young adults: Evidence for a sensitive period?
Margarida Da Fonseca, Annabel Joan Cohen

133 WITHDRAWN

134 Prospective Memory in Aging, Mild Cognitive Impairment, and Alzheimer's Disease
Laura Thompson, Michael Van Adel, Emery Terrell, Vanessa Taler

135 Introducing SuperPsychToolbox: an open-source tool to facilitate coding and analysis of psychology experiments
Jeffrey Mountjoy, Jordan Poppenk

136 Mentoring Matters: Why Undergraduate Psychology Students in Canada Need Mentorship
Zarina Giannone

137 Believing is Doing? Weighing the Costs and Benefits in Responding to Emotionally Evocative Situations
Esther L Briner, Catherine N.M. Ortner

138 Sub-maximal aerobic exercise: a therapeutic approach for prolonged concussion symptoms
Christophe Alarie, Robert D Moore, Dave Ellemberg

139 Quanty: An online game for eliciting the wisdom of the crowd
Wahida Amin Chowdhury

140 Restoring land and mind: The benefits of an outdoor walk on mood are enhanced in a naturalized landfill area versus its neighbouring urban area
Shawn N. Geniole, Joacy P.F. David, Roseanne F.R. Euzébio, Beatriz Z.S. Toledo, Andrea I.M. Neves, Cheryl M. McCormick

141* When your past influences your present: History of object placement affects human spatial organization
Mona J.H. Zhu, Evan F. Risko

142 Individual differences predict emotion regulation choices and subsequent psychological well-being
Catherine Nicole Marie Ortner, Daniela Corno, Tsz Yin Fung, Karli Rapinda

143 Determining mean heart rate at symptomatic threshold in post-concussion syndrome
Marc Létourneau, C. Alarie, R. D. Moore, D. Ellemberg

144 Social Interest and Emotion in Relation to Motives for Volunteering
Karli Rapinda

145 A Collection of Emotional Movie Clips
Kylee T. Ramdeen, Annick N. Tanguay, Christine Beaudoin, Lydia Muyingo, Patrick S. R. Davidson

146 The effects of income, looks, intelligence, and devotion on short-term dating preferences in an online setting
Daniela Corno, Michael Woloszyn

147 Task-Irrelevant Contextual Cues Can Bias the Content of Mind Wandering
Mitchell Reid LaPointe, Melaina T. Vinski, Scott Watter

148 Norm Diffusion in Scientific Social Networks: Adoption of Scientific Integrity Norms by Academic Institutions
Corrina Cai, Jordan Richard Schoenherr

149 Students' use of online resources and their grades in an introductory statistics course
Bob Uttl, Carmela A. White, Joy M. Hodgson

150 Psychopathic traits and perception of ambiguity in emotional stimuli
Angel Mackenzie, John Logan

151 Don't listen to your heart: The relationship between affective intuition and cognitive performance
Kristen Louise Blackler, Erin Beatty, Oshin Vartanian

152 Is Theory of Mind Dependent Upon Language Abilities?
Stephen D. Smith, Michelle S. J. Di Nella

153 Historical Cognition: Cognitive Biases in Historical Reasoning
Cindel White, Chad Buckland, Marcie Penner-Wilger, Graham Broad

154 Remediating Intuitive Statistical Biases: The Effect of Practice and Feedback
Patrick Grant Welch, Chris Oriet

155 Intuitive Statistical Reasoning: Improving Students' Understanding of Normative ANOVA Logic
Mark C. Adkins, Chris Oriet

156 Argument complexity: Teaching undergrads and fighting terrorism
Robert L West, Matthew Alexander Kelly

Poster Session 2

Saturday June 6th 11:30 a.m. – 12:55 p.m.

River Building 2220, 2224, 2228

200 The Effect of Age and Alzheimer's Type Dementia on Error Repetition in Tip-of-the-Tongue States
Kathleen Oliver, Karin R. Humphreys

201 The effects of physical activity on cognitive flexibility in aged rats.
Elham Satvat, Erika Lui, Misbah Salim, Sandra Abdel Malek, Nikita Puri

202 The role of direction, distance, weight and light cues in memory retrieval
Sandra L. Wright, Miranda Benoit, Matthew L. Ingram, Christina Thorpe, Darlene M. Skinner, Gerard M. Martin

203 Effect of Ageing on Visuospatial Attention and Visual Working Memory: An ERP Study.
Manon Maheux, Pierre Jolicoeur

204 Numerical Context and Time Perception: Contrast Effects and the Perceived Duration of Numbers
Alexander Cameron Walker, Doug Alards-Tomalin, Alexa Kravetz, Launa Leboe-McGowan

205 Eyes Have Ears: Pupil Dilation as an Index of Auditory Attentional Capture
Alexandre Marois, Maxime Legendre, François Vachon

206 ERP Effects of Number of Associates and Semantic Neighbours in a Lexical Decision Task
Rocio Adriana Lopez Zunini, Stephanie Marie Flood, Vanessa Taler

207 Are there feelings in feelings-of-knowing?
Christopher Mark Fiacconi, Stefan Köhler

208 The Effects of Object Similarity and Conguency on Visuo-Haptic Recognition
Melanie Nadeau, Geneviève Desmarais

209 Social Phobia and Emotional Faces: What are you thinking? Is it about me?
Darren W Campbell

210 Neural Representation of Emotion across Modalities
Jocelyne C. Whitehead, Jorge L. Armony

211 Difficulties with exploratory behaviour following right brain damage.
Alex Filipowicz, Elisabeth Stöttinger, Amy Willms, Britt Anderson, James Danckert

212 Empathy traits and emotional regulation relate to motor cortex excitability during the observation of emotional images
Annick N. Tanguay, Sherry El Rashidy, Anthony Remaud, Kylee T. Ramdeen, Patrick S. R. Davidson, François Tremblay

213 Processing of Emotional Auditory Stimuli: A MEG Approach
Kyle Logie, Simon Rigoulot, Pierre Jolicoeur, Jorge L Armony

214 What's in a line? The influence of valence, faces, and language on pseudoneglect
Bianca DM Hatin, Laurie Sykes Tottenham

215 A Translational Rodent Model of Cognitive Bias
Kai Wang

216 Do stress responses mediate the relationship between math anxiety and math performance?
Denis MJ Gavigan, Laurie Sykes Tottenham

217 Cortical responses to Social Auditory and Visual Stimuli: A functional Near-Infrared Spectroscopy (fNIRS) Study.
Lucas Peek, Thibaud Audevard, Etienne Bisaillon-Sicotte, Shirin Tabrizi, Manon Maheux, Pierre Jolicoeur, Jorge L Armony

218* Behavioral and neural consequences of hearing the past and the future during music performance
Brian Mathias, Guido Guberman, William J. Gehring, Caroline Palmer

219 Multiline Slots: Gambling Persistence, Erroneous Cognitions, and Problem Gambling
Candice Graydon, Mike Dixon, Madison Stange, Jonathan Fugelsang

220 Accident proneness, laterality, and time estimation
Thomas Murphy, Daniel Voyer

221 Persistent Psycho-affective Outcomes of Concussions in Male Athlete
William Sauvé, Robert Davis Moore, Dave Ellemberg

222 Effects of bilingualism and age on verbal fluency performance in English monolinguals and French-English bilinguals
Jonathan Ngoc Tran, Christine L Sheppard, Shanna Kousaie, Vanessa Taler

223 Sensitivity of the CogState Test Battery for Detecting Persistent Concussion-Related Cognitive Deficits
Veronik Sicard, Robert Davis Moore, Dave Ellemberg

224 Cognitive Training in Healthy Older Adults
Vina Goghari, May Luu, Aiko Dolatre

225 EEG correlates of persistent alterations in mood and affect in athletes with a history of concussion
R. Davis Moore, William Sauve, Dave Ellemberg

226 Persistent neurophysiological alterations in soccer players with and without a history of concussion
Julien Lepine, Robert Davis Moore, Dave Ellemberg

227 Human Action Perception: The Effects of Goals and Inversion
Matthew Pechey, Jeff Loucks

228 Exploring affective responses to environments: The effects of visual spatial frequencies.
Deltcho Valtchanov, Colin Ellard

229 Analysis of eye-movements in the judgment of the authenticity of smiles in schizophrenia
Annalie Marie Pelot, Melanie Perron, Annie Roy-Charland, Randal Joseph Ryan, Albert Gouge, Stacey Roles

230 Sensitivity to horizontal structure and face identification in developmental prosopagnosia and healthy aging
Matthew V. Pachai, Sherryse Corrow, Patrick J. Bennett, Jason J.S. Barton, Allison B. Sekuler

231 When the going gets tough the beautiful get going: Aesthetic appeal facilitates task performance.
Irene Reppa, Sine McDougall

232 When does four become shorter than eight? Numerical magnitude effects on the perceived duration of empty intervals.
Vincent Laflamme

233 Vulnerability versus virility: The facial cues, and sensitivity to the cues, that influence economic bargaining
Elliott T. MacDonell, Shawn N. Geniole, Cheryl M. McCormick

234 The dynamics of audio-visual integration capacity as determined by temporal unpredictability, proactive interference, and SOA
Jonathan Michael Paul Wilbiks, Ben J Dyson

235 Influence of Spatial versus Orientation Probability on Perceptual Estimations
Syaheed Jabar, Britt Anderson

236 Differential effects of performance-based rewards on the allocation of spatial attention
Christie Rose Marie Haskell, Britt Anderson

237 Expecting the view of a negative picture disrupts time perception
Emilie Gontier, Giovanna Mioni, Vincent Laflamme, Guillaume Plante, Simon Grondin

238 The Effect of Voice Pitch on Trusting Behavior
Kelyn Jeanette Montano, Cara Tigue, Sari Isenstein, Pat Barclay, David Russell Feinberg

239* Handedness determines nostril dominance in trigeminal perception
Simona Manescu, Benjhyna Daniel, Renée-Pier Filiou, Franco Lepore, Johannes Frasnelli

240 The Effects of Experience, Semantic Congruency, and Spatial Congruency on Multisensory Integration
Daryl Atkinson, Geneviève Desmarais

241 About the modality effect on time reproduction
Guillaume Plante, Pier-Luc Gamache, Simon Grondin

242 IAMFaRR: Individual Assessment of Maximum Facial Recognition Range
Charles Collin, Andrea Trebilcock, Laura Ziebell, Heather Woods-Fry

243 Can increasing eye fixations improve face recognition in males?
Brendan M. Stanley, Zachary James Livshin, Matthew V Pachai, David I Shore

244 The Matrix: Does the presence of a visual pattern facilitate the learning of a spatial pattern in rats?
Mark Cole, Sachia Grogan

Symposium Session 1
Saturday June 6th (1:00 p.m. – 2:00 p.m.)

Symposium: Embodied Cognition

Organizer: Evan F. Risko

University Centre 180

1:00 – 1:15 **[250] Embodiment of Verb Meaning**
Penny M. Pexman [1], David Sidhu [1], Paul Siakaluk [2]
University of Calgary [1], University of British Columbia [2]

1:15 – 1:30 *[251] **Embodied Representation of Word Meaning**
Corson Areshenkoff, Daniel N. Bub, Michael E.J. Masson
University of Victoria

1:30 – 1:45 **[252] The Principles of Attentional Selection are Profoundly Different for the Head and Eyes**
Grayden Solman[1], Tom Foulsham[2], Alan Kingstone[1]
University of British Columbia[1], University of Essex[2]

1:45 – 2:00 **[253] Cognitive Offloading: Scarcity and the Avoidance of Mental Demand**
Evan F. Risko, Tim L. Dunn
University of Waterloo

Symposium: Probing the Link Between Brain and Behavior with Optogenetics

Organizer: Matthew Holahan

University Centre 182

1:00 – 1:15 **[254] Neural Mechanisms Underlying Behavioral Reinforcement in the Basal Ganglia**
Jonathan Phillip Britt
McGill University

1:15 – 1:30 **[255] Probing the Link Between Brain and Behavior with Optogenetics. Behavioral Dissection of the Role of Dopamine on Reward Seeking in Rats Working for Optical Stimulation of Midbrain Dopamine Neurons**
Ivan Trujillo-Pisanty
Concordia University

1:30 – 1:45 **[256] Exploring Sensory Activity and Plasticity with Spinal Optogenetics**
Robert Bonin
Laval University

1:45 – 2:00 **[257] Optogenetic Targeting of Serotonin Neurons to Study Anxiety and Depression**
Paul R. Albert, Ginette Hupe, Sean Geddes, Jean-Claude Beique
University of Ottawa

Symposium: Reading Words for Meaning: Semantics and Morphology (Part 1)

Organizer: Stephen J. Lupker

River Building 2200

1:00 – 1:15 **[258] Charting the Flexibility of Semantic Processing Using Concreteness and Semantic Neighbourhood Density**
Ashley Danguecan, Lori Buchanan
University of Windsor

1:15 – 1:30 **[259] The Effects of Emotional Experience in Conceptual Processing**
Ian Newcombe[1], Paul D. Siakaluk[1], Tamara Kumpan[1], Brian Duffels[1], Penny Pexman[2]
University of Northern British Columbia[1], *University of Calgary*[2]

1:30 – 1:45 **[260] The Contribution of Semantics and Phonology to Gender and Lexical Decision**
Alain Desrochers
University of Ottawa

1:45 – 2:00 **[261] Semantic Activation from Print: Strategic Versus Structural Limitations**
Darcy White, Derek Besner
University of Waterloo

Symposium: Models of Cognitive Processing: Implications for Clinical Reasoning and Decision Making in Medicine

Organizer: Timothy J. Wood

River Building 1200

1:00 – 1:15 **[262] Models of Cognitive Processing: Implications for Clinical Reasoning and Decision Making in Medicine**
Geoffrey R. Norman
McMaster University

1:15 – 1:30 **[263] Classrooms, Clinics, and Cognition: Transfer and Integration of Medical Knowledge**
Kulamakan Kulasegaram
University of Toronto

1:30 – 1:45 **[264] Models of Cognitive Processing and Diagnostic Reasoning**
Sandra D. Monteiro
McMaster University

1:45 – 2:00 **[265] The Role of Emotions in Clinical Reasoning**
Meghan M. McConnell
McMaster University

Symposium Session 2
Saturday June 6th (2:15 p.m. – 3:15 p.m.)

Symposium: Processes in Numerical Cognition

Organizer: Jo-Anne LeFevre
University Centre 180

2:15 – 2:30 **[266] Calculation: A Digital Domain**
Marcie Penner-Wilger, Rylan J. Waring, Adam T. Newton, Cindel White
King's University College at Western University

2:30 – 2:45 **[267] Response Trajectories Support a Late-Interaction Model of the Size-Congruity Effect**
Thomas Faulkenberry[1], Alexander Cruise[2], Dmitri Lavro[3], Samuel Shaki[2]
Tarleton State University1, Ariel University[2], Ben Gurion University of the Negev[3]

2:45 – 3:00 **[268] Numbers and Cents: The Relationship Between Math Anxiety and Financial Literacy**
Rachel Fine, Erin Maloney, Sian Beilock
University of Chicago

3:00 – 3:15 **[269] Comparing Strategies & Discovering Unobservable Mental Stages in Problem Solving using fMRI.**
Aryn Pyke, John R. Anderson
Carnegie Mellon University

Symposium: Mechanisms of Selective-Attention in the Normal and Concussed Brain: Evidence from Human Electrophysiology

Organizer: Talia Losier
University Centre 182

2:15 – 2:30 **[270] Encoding, Attention, and Masking in the Attentional Blink**
Talia Losier
Université de Montréal

2:30 – 2:45 **[271] A More Efficient Deployment of Attention Predicts Faster Reaction Times: Evidence from the N2pc.**
Brandi Lee Drisdelle, Gregory West, Pierre Jolicoeur
Université de Montréal

2:45 – 3:00 **[272] Orienting Attention to Sound Object Representation in Short-Term Memory**
Claude Alain
University of Toronto

3:00 – 3:15 **[273] Désynchronisation alpha pour une tâche attentionnelle chez des sujets commotionnés**
Louis De Beaumont[1], Pierre Jolicoeur[2]
Université of Quebec at Trois-Rivieres[1], Université de Montréal[2]

Symposium: Reading Words for Meaning: Semantics and Morphology (Part 2)

Organizer: Stephen J. Lupker
River Building 2200

2:15 – 2:30 **[274] Semantic Richness Effects in Word and Picture Classification**
Penny M. Pexman[1], Alex Taikh[2], Ian Hargreaves[1], Melvin Yap[3]
University of Calgary[1], Western University[2], National University Singapore[3]

2:30 – 2:45 **[275] Performance Impact of Morphological Decomposition and Stop-lists on Corpus-based Semantic Space Models**
Jeff Keith, Chris Westbury
University of Alberta

2:45 – 3:00 **[276] Morphological Priming in the Sandwich Priming Paradigm**
Stephen J. Lupker
University of Western Ontario

3:00 – 3:15 **[277] Semantic Effects in Morphological Processing**
Debra Jared, Olessia Jouravlev
University of Western Ontario

Symposium: Aviation Psychology

Organizer: Chris Herdman
River Building 1200

2:15 – 2:30 **[278] Visual Perception and Performance during NVG-aided Civilian Helicopter Flight**
Robert Allison[1], Sion Jennings[2], Greg Craig [2]
York University[1], National Research Council of Canada[2]

2:30 – 2:45 **[279] Predictors of Pilot Prospective Memory: the Relative Effects of Domain-General and Domain-Specific Cognitive Processes**
Kathleen Van Benthem
Carleton University

2:45 – 3:00 **[280] Isolating the Contribution of Disturbance Cues from Physical Motion on Training in a Motion Simulator**
Shannon O'Malley[1], Amentha Rajagobal[1], Joey Legere, [1] John G. Grundy[2], Martin von Mohrenschildt[1], Judith M Shedden[1]
McMaster University[1], York University[2]

3:00 – 3:15 **[281] Helicopter Pilot Heart Rate Variability in Relation to Differences in Rotor Tuning and Seat Cushion Impedance**
Jocelyn M. Keillor, Gregory L. Craig, Heather E. Wright -Beatty, Marc D. Alexander, Nicholas Berezny, Viresh Wickramasinghe
National Research Council Canada

Symposium Session 3
Saturday June 6th (3:30 p.m. – 4:30 p.m.)

Symposium: Predictors of Children's Early Mathematical Development

Organizer: Erin Anne Maloney
University Centre 180

3:30 – 3:45 **[282] The Cognitive and Mathematical Profiles of Children in Early Elementary School**
Adam Taylor Newton[1], Marcie Penner-Wilger[2]
Western University[1], King's University College at Western University[2]

3:45 – 4:00 **[283] Cognitive Abilities Underlying Mathematics Development, and the role of Construction Play**
Swiya Nath
University of Cambridge

4:00 – 4:15 **[284] Children's Mathematics Anxiety and its Effect of their Conceptual Understanding of Arithmetic and Arithmetic Fluency**
Jill Alexandra Beatrice Price
University of Regina

4:15 – 4:30 **[285] Teachers' Stereotype Endorsement Hinders Girls' Math Achievement and Increases their Math Anxiety**
Erin Anne Maloney, Elizabeth Gunderson, Gerardo Ramirez, Susan Levine, Sian Beilock
University of Chicago

Symposium: Perception of Self-Motion

Organizer: Shannon O'Malley
University Centre 182

3:30 – 3:45 **[286] The Integration of Physical Acceleration Cues with Visual Acceleration Cues**
Shannon O'Malley, Ben Townsend, Martin von Mohrenschildt, Judith M Shedden
McMaster University

3:45 – 4:00 **[287] Time Flies When You're Not Standing Still**
Michael Barnett-Cowan
University of Waterloo

4:00 – 4:15 **[288] Perception of Travelled Distance during Self-motion**
Hong-jin Sun (sunhong@mcmaster.ca)
McMaster University

4:15 – 4:30 **[289] Self -Motion Evoked from the Far Periphery**
Laurence Harris, Meaghan McManus
York University

Symposium: Language Comprehension and Representation

Organizer: Murray Singer
River Building 2200

3:30 – 3:45 **[290] Action Representations Evoked by Object Names**
Ragav Kumar, Michael E.J. Masson, Daniel N. Bub
University of Victoria

3:45 – 4:00 **[291] Validating Given Versus New Discourse Information**
Murray Singer, Kevin G. Solar, Jackie Spear
University of Manitoba

4:00 – 4:15 **[292] The Influence of Temporal Information Associated with Verbs and Visual Perspective on Imagining Events**
Todd Ferretti[1], Jeffrey Hong[1], Deanna Hall[1], James Siklos-Whillans[2]
Wilfrid Laurier University[1], University of York[2]

4:15 – 4:30 **[293] The Role of the Deictic Centre in Narrative Comprehension and Interpretation**
Peter Dixon, Marisa Bortolussi
University of Alberta

Symposium: Interactive Social Cognition: An Emerging Science

Organizer: Elina Birmingham
River Building 1200

3:30 – 3:45 **[294] Spontaneous Gaze Following within Face-to-Face Interactions: an Examination of Children and Adolescents with Autism Spectrum Disorders**
Elina Birmingham
Simon Fraser University

3:45 – 4:00 **[295] Searching for Social Attention in Real Life Social Interactions**
Dana A Hayward[1], Willa Voorhies[1], Sally Wong[2], Jelena Ristic[1]
McGill University[1], University of Toronto[2]

4:00 – 4:15 **[296] Shared Goals and Shared Control: Neurocognitive Processes and Phenomenology of Joint Action**
Janeen Loehr
University of Saskatchewan

4:15 – 4:30 **[297] Social Cueing: Seeing Decision-Making in Action**
Ana Pesquita[1], Craig S. Chapman[2], James T. Enns[1]
University of British Columbia[1], University of Alberta[2]

Poster Session 3

Saturday June 6th (4:30 – 6:00 p.m.)
River Building 2220, 2224, 2228

300 **Predictors of arithmetic fluency in adults: Linking symbols to quantities**
Carla Sowinski, Feng Gu, Ryan Pusiak, Jo-Anne LeFevre

301 **Real bodies and occlusion: Item types, cognitive strategies, and gender differences in mental rotation**
Randi Alison Doyle, Daniel Voyer

302 **Wait for it: what modifying inter-stimuli interval in a comparison task tells about priming effects and visual working memory**
Marc-André Goulet, Denis Cousineau

303 **Distorted subjective time during the dual-task bottleneck is not caused by delayed stimulus perception**
Michael David Klein, Jennifer A Stolz

304 **Is Systems Factorial Technology capable of false positives? An SFT analysis applied to the Linear Ballistic Accumulator**
Bradley Harding, Marc-André Goulet, Vincent Leblanc, Christophe Tremblay, Sylvain Chartier, Denis Cousineau

305 **Low Perceived Control Predicts Engagement and Diminished Boredom**
Andriy Struk, Abigail Scholer, James Danckert

306* **The Effect of Success on Metacognition and Category Learning**
Mario Enrique Doyle

308 **Dynamic Face Processing in Adults with and without Autism Spectrum Disorders**
Sarah Nugent Rigby

309 **The Confusion of Fear and Surprise: A Developmental Study of the Perceptual-Attentional Limitation Hypothesis using Eye Movements**
Mélanie Perron, Annie Roy-Charland, Cheryl Young, Jessica Boulard, Justin Chamberland

310 **The Numerical Distance Effect and Order: A Double Dissociation Between Online and Duration Measures**
Elie Ohana, Evan Risko, Derek Besner

311 **A Re-Examination Of "Groupitizing": The Effect of Number of Groups**
Feng Gu, Jo-Anne LeFevre

312 An Independent Analysis of Schema Violation Using the Go/No Go Association Task
Serena Lynch, Michelle Graham, Justin Chamberland, Joel Dickinson

313 Does Semantic Priming Affect Perception or Motor Processes?
Mehreen Nadeem, Peter Dixon

314 Different consequences of generating and choosing labels during affect labeling
Lisa Hodgson, Catherine Ortner

315 The Importance of Verbatim Report: A Between-Subjects Investigation
Kayla J.J. Beasley, Justin A Chamberland, Joel Dickinson

316 Patterns of search in experiential sampling: Investigating piecewise search
Pete Wegier, Laura J. Bianchi, Julia Spaniol

317 Neural principal component analysis for learning multiple datasets
Sylvain Chartier, Matt Ross

318 Auditory-motor interactions in the music production of musicians and non-musicians
Daniela Caruso, Tara Vongpaisal

319 Valence Contamination
Christopher Lee, Anna Maslany, Peter Graf

320 Expert Video Game Players Show No Cognitive Control Advantage in Task Switching
Julie Conder, Karin R Humphreys, Scott Watter

321 Expert Video Game Players Show No Cognitive Control Benefit in N-Back Performance
Stefania Cerisano, Julie Conder, Karin R Humphreys, Scott Watter

322 What we say versus where we look: Assessing Procedure Use in a Simple Addition Task with Eye-Movement Patterns
Matthew Gerald Huebner, Andrea Howard, Jo-Anne LeFevre

323 Arithmetic and Eye Tracking: Addition and Multiplication
Ryan John Patrick Pusiak

324 Processing singular and plural nouns: When does surface frequency play a role?
Robyn Carson, Alain Desrochers, Aude Beauchemin, Kayla Soosaar

325 Stage-Specific Attentional Mechanisms of Desirable Difficulty
Melissa J Ptok, Sandra J Thomson, Scott Watter, Karin R Humphreys

326 Temporal perception of supra-threshold object representations: Effects of object-substitution masking
Daryl Edward Wilson, Geoffrey Harrison, Jason Rajsic, Chelsia Lau

327 You'll change more than I will: Adults' predictions about their own and others' future preferences
Leia Kopp, Louis Renoult, Patrick S.R. Davidson, Vanessa Taler, Cristina M. Atance

328 An Order of Magnitude: Symbolic and Non-Symbolic Ordinality as Predictors of Exact and Approximate Calculation in Adults
Rylan James Waring, Marcie Penner-Wilger

329 The Impact of Display Time; Confusion between Emotional Facial Expressions of Fear and Surprise
Justin A Chamberland, Kayla Beasley, Melissa Laurin, Nakita-Rose Morrisseau, Brigitte North, Margaret Osborne, Selma Ozhan

330 Math Anxiety: Not just a Numbers Game
Heather Douglas, Jo-Anne LeFevre, Kelsey MacKay

331 The Effects of Aging on Visual Distraction in a Modified Stroop Task
Amy Hatcher

332 Nimage: Using visible persistence to constrain a model of visual processing
Can Serif Mekik, Sterling Somers, Michael O. Vertolli, Terrence C. Stewart, Jim Davies

333 Tracking eye movements during mental division
Shawn Tan, Jo-Anne LeFevre

334 Facial Emotion Recognition and Reaction in a Non-suicidal Self-injury Population
Laura Ziebell

335 Blended control over T1 encoding in the attentional blink (AB)
Ellen K MacLellan, David I Shore, Bruce Milliken

336 Gender Differences in Metacognitive Judgements of Navigational Learning
Charles Collin, Chantal Lemieux, Nicholas N Watier

337 Number Direction and Its Impact on Perceived Sound Loudness
Doug W Alards-Tomalin, Hillary Nepon, Launa C Leboe-McGowan

338 The Effects of Self-Regulatory Depletion on the Two-Systems of Category Learning
Tianshu Zhu, John Paul Minda

339 The Relationship between Creativity and Cognitive Switching: Mediating Effect of Intelligence
Xuan Pan

340 The role of musical vs tone-language experience on implicit choice of key for singing a familiar song
Bing-Yi Pan, Annabel J Cohen

341 Is 9 Louder than 1? Audiovisual Cross-Modal Interactions between Number Magnitude and Judged Sound Intensity
Alexander Cameron Walker, Doug Alards-Tomalin, Joshua Shaw, Launa Leboe-McGowan

342 Free-walking rhythmic auditory stimulation: Effects of familiarity and groove on gait
Emily Ann Ready, Lucy Marjorie Joanne McGarry, Cricia Rinchon, Jeffrey David Holmes, Jessica Adrienne Grahn

343 Dorsal striatum mediates cognitive control, not cognitive effort per se, in decision-making: An event-related fMRI study
Brian D Robertson

344 The Effect of Predictor and Criterion Spacing in Function Learning
Mark A. Brown, Miles Parkinson, Guy Lacroix

345 The Role Of Verb-Propositional Complexity in Semantic Representation and Sentence Recall
Roberto G. de Almeida, Julie Turbide

346 Does Psychoacoustic Coherence Influence Cognitive and Affective Responses to Music?
Tanor Bonin, Daniel Smilek

347 Morality and the Emotions
Nalini Elisa Ramlakhan

348 Technological factors as modulators of processing fluency in video communication
Joey Legere, Ksenia Gueletina, Mahyar Garmsiri, Kyle Comishen, Nicole LeBarr, Catherine Connelly, Judith Shedden

349 Levels of acculturation are associated with executive-function task performances
Julie Chang, Peter Graf

350 The Representation of Colour in Object Memory: Evidence from Recognition-Induced Forgetting.
Irene Reppa, Kate Elizabeth Williams

Poster Session 4

Sunday June 7th (11:30 a.m. – 12:45 p.m.)
River Building 2220, 2224, 2228

400 **Neuropeptide CRH modulates brain plasticity in the mesocorticolimbic network: Role in modulating dopamine and social behavior following a cerebral ischemia.**
Nicolas Narvaez Linares, Patricia Barra de la Tremblaye, Hélène Plamondon

401 **The development of an event-related brain potential measure to investigate the hostile attribution bias**
Jean Gagnon, Mercédès Aubin, Alex Fernet Brochu, Sophie Derguy, Monique Bessette, Pierre Jolicoeur

402 **Change-blindness in a driving simulator: A test of motorcycle conspicuity**
Bertrand Sager, Elisabeth Kreykenbohm, Thomas M Spalek

403 **Motorcycles are not invisible: Examining motorcycle conspicuity using change-blindness and eye-tracking**
Elisabeth Kreykenbohm, Bertrand Sager, Farhad N Dastur, David J Froc, Daniel M Bernstein

404* **Can People Strategically Mind-Wander?**
Paul Seli, Jeffrey Wammes, Daniel Smilek

405 **Alcohol consumption and attentional bias: A study of individuals in treatment and binge drinkers**
Corie Ann Flesch, Leïla Reguigui, Annie Roy-Charland

406 **Comparing Divided Attention Performance to Models of Focused Attention**
Brian Douglas, Harvey Marmurek

407 **Exogenous Cues Differentially Affect Selection and Discrimination of Contrast**
Britt Anderson

408 **The effect of feedback on response time consistency varies with age**
Brandon P Vasquez, Nicole D Anderson

409 **Controlling a Wandering Mind: Tasks dictate differences in estimates of mind wandering**
Effie J. Pereira, Lauri Gurguryan, Jelena Ristic

410 **Remember me? Social working memory load affects social orienting.**
Todd Vogel, Jelena Ristic

411 **The beauty versus the beast: Exploring the relationship between affect and attention**
Anna Maslany, Rebecca Stanczyk, Ashlee Ko, Peter Graf

412 **The Effect of Local Statistical Summary Representation on Visual Search**
Nathan Baron, Chris Oriet

413 **Quantifying the variance in eye movements while watching intact versus scrambled movies**
Karine Elalouf, Lucy Farisello, Jacob Applebaum, Jim G. Pfaus, Aaron P. Johnson

414 **Mind-wandering and reading difficulty: A tale of two effects**
Noah David Forrin, J Charles Millar, Jane Adair Klinger, Daniel Smilek

415 **Looking at endogenous prior entry effects in baseball judgements at first base**
Ghislain d'Entremont, Ralph Sidney Redden, Michael A Lawrence, Raymond M Klein

416 **Is Working Memory Capacity Predictive of the Resistance to the Semantic Deviation Effect?**
Katherine Labonté, Rosalie Savard, Maxime Legendre, François Vachon

417* **Semantic Transfer in Colour-Word Contingency Learning**
Olivia Y.H. Lin, Colin M. MacLeod

418 **Reports of mind wandering are shaped by available information**
James Farley, Peter Dixon

419 **Conflicting effects of context in change detection and visual search: A dual process account**
Mitchell Reid LaPointe, Bruce Milliken

420 **Comparison of Perceptual and Working Memory Distractors on a Search Task**
Emily Britton, Geoffrey Harrison, Daryl Wilson

421 **Does distractor devaluation generalize to sound?**
Biljana Stevanovski, Zachariah Coakley

422 **Differing effects of sensory degradation on cross-modal auditory and visual distractor processing**
Rajwant Sandhu, Ben Dyson

423 **WITHDRAWN**

424 **Drawing at encoding: Enhanced memory benefits in older adults.**
Melissa E Meade, Myra A Fernandes

425 Cognitive Rules to Multiple Cue Probability Learning
Wahida Amin Chowdhury

426 Cue contamination: Prospective memory cues disrupt retrospective memory retrieval processes
Michelle Leanne Crease Lark, Peter Graf, Randall K Jamieson

428 Word Crimes: Word identification difficulty improves memory
Natasha Pestonji, Peter Graf

429 Modelling word-specific false recognition rates in the DRM test
Rory M Waisman, Brendan T Johns, Randall K Jamieson

430 Event generation following medial temporal lobe damage: Using unbiased ratings to assess the quality of the remembered events.
Ariella Lenton-Brym, Shayna Rosenbaum, Signy Sheldon

431 Individual differences in memory
Signy Sheldon

432 Intrinsic, but not extrinsic motor characteristics influence object retention
Sébastien Lagacé, Katherine Guérard

433 The role of language production in the Hebb repetition effect
Marie-Claude Guerrette, Jean Saint-Aubin, Katherine Guérard

434* The Global Precedence Effect in Recognition Memory for Scenes
Fahad Naveed Ahmad, Morris Moscovitch, William Hockley

435 Holographic declarative memory and the fan effect: A test case for a new memory module for ACT-R
Matthew Alexander Kelly, Kam Kwok, Robert L West

436 Desirable difficulty: The benefit of perceptual disfluency on remembering
Hanae Davis, Tamara Rosner, Zahra Khalesi, Bruce Milliken

437 Semantic Memory for Biological and Artifact Items in Mild Cognitive Impairment.
Natalie Anne Lockyer, Christine Sheppard, Vanessa Taler

438 Is the constituent order fundamental or additional to the association memory?
Kenichi Kato, Jeremy B. Caplan

439 The influence of time monitoring and cognitive load on time-based prospective memory
André Morin, Giovanna Mioni, Simon Grondin

440 Any Effects of Cognitive Priming on Object-Location Memory are Smaller than Originally Reported
Abdo Elnakouri, Kerri Adams, Héloïse Drouin, Patrick Davidson

441 WITHDRAWN

442 The Complex Interplay of Encoding Demands, Repetition, and Recognition
Robert Collins, Annie Mills, Tamara Rosner, Bruce Milliken

443 A Systematic Review: Reliabilities of Prospective Memory Measures
Laura Morgan Grant, Bob Uttl, Kelsey Cnudde

444* The drawing effect: Evidence for reliable and robust memorial benefits.
Jeffrey D Wammes, Melissa E Meade, Myra A Fernandes

445 A systematic review: Prospective memory and nicotine
Bob Uttl, Cassidy Wilson

446 Learning multiple target-context relations in a modified contextual cueing paradigm
Yabo Hui, Chen Song, Bishoy Ragheb, Chao Wang, Guang Zhao, Xuejun Bai, Hong-jin Sun

447 The Contribution of Response Selection in the Contextual Cueing Effect
Chen Song, Yabo Hui, Chao Wang, Guang Zhao, Xuejun Bai, Hong-Jin Sun

448 Why remember now what I can remember later? Effects of reviewing photos on memory
Philip Micheal Aucoin, Angela Rae Birt

449 Probability Cuing in Visual Search: an Investigation in Simulation of Real World Scene
Ying Fang, Shahan Tariq, Shiyi Li, Nadia Wong, Xuejun Bai, Hong-Jin Sun

450 Brand knowledge increases search efficiency during hybrid visual search.
Aaron P. Johnson, John O. Brand, Onur Bodur, Bianca Grohmann

451 Does T1 difficulty modulate AB magnitude? It depends on how you measure it
Hayley E.P. Lagroix, Thomas M. Spalek, Vincent Di Lollo

452 Thinking in the shadow of the Internet: Effects on metacognitive control
Amanda M Ferguson, Dave McLean, Evan F Risko

453 Psychology Students Don't Think Science When They Think Psychology
Lindsay Morgan, Gina Hernandez, Tess Walsh, Guy Lacroix

Colloqium Session 1 (Sunday June 7th- 12:50 – 2:05 p.m.)

Cognition I

University Centre 180

12:50 – 1:05 *[500] **Inhibitory devaluation of distractors that match the contents of visual working memory**
David De Vito, Mark J. Fenske
University of Guelph

1:05 – 1:20 *[501] **The Production Effect and Divided Attention: Is Purposeful Attention Required?**
Brandon J. Slaney, Kathleen L. Hourihan
Memorial University of Newfoundland2

1:20 – 1:35 [502] **The impact of Explicit Strategy on Pop-Out Search: Using Imagination to Reverse Repetition Effects**
Brett Cochrane
McMaster University

1:35 – 1:50 [503] **Avoiding Perceived Cognitive Effort**
Timothy L. Dunn, Evan F. Risko
University of Waterloo

1:50 –2:05 [504] **Quantifying Qualitative Aspects of Consciousness using Object-Substitution Masking**
Geoffrey William Harrison[1], Jason Rajsic[2], Daryl Edward Wilson[1]
Queen's University[1], University of Toronto[2]

Memory I

University Centre 182

12:50 – 1:05 [505] **Context effects on recognition memory: Manipulating the meaningfulness of the context influences recognition memory**
Zeynep Barlas, William E. Hockley, *Wilfrid Laurier University*

1:05– 1:20 [506] **How We Make Forced-Choice Decisions: A Challenge to Signal-Detection Theory**
D. J. K. Mewhort, Elizabeth Johns
Queen's University

1:20 – 1:35 *[507] **Weighted Integration of Landmarks in a One-Dimensional Spatial Search Task**
Yu Du[1], Neil McMillan[1], Christopher R. Madan[2], Marcia L. Spetch[1]
University of Alberta[1], Boston College[2]

1:35 – 1:50 [508] **Dissociating Performance Dynamics in the Aftermath of an Uninformative Cue: Input or Output Effect?**
Ralph S. Redden, Matthew D. Hilchey, Raymond M. Klein
Dalhousie University

1:50 – 2:05 [509] **Feedback and Criterion Shifting in a Sequence Effect Study**
Samuel Hannah, Taylor Summach
University of Saskatchewan

Neuroscience I

River Building 2200

12:50 – 1:05 **[510] Determining the Linguistic Information Sources Underlying Verbal Fluency Performance across Aging and Cognitive Impairment**
Vanessa Taler[1], Brendan Johns[2], Christine Sheppard[3], Michael Jones[4]
University of Ottawa[1], Queen's University[2], University of Waterloo[3], Indiana University[4]

1:05 – 1:20 **[511] The Neural Correlates of Vection - an fMRI study**
Ramy Kirollos[1], Robert Allison[2], Stephen Palmisano[3]
Carleton University[1], York University[2], University of Wollongong[3]

1:20 – 1:35 **[512] ERPs Reliably Track Visuo-Spatial Attention**
Thomas Thiery, Martin Arguin, Pierre Jolicoeur
University of Montreal

1:35 – 1:50 **[513] Optimizing Combined fMRI-DTI-TMS-ERP Methods to Identify and Regulate Reward Valuation During Nicotine Craving**
Travis Edward Baker, Alan Tucholka, Stephane Potvin, Paul Lesperance, Didier Jutras-Aswad, Kevin Larcher, Patricia Conrod
University of Montreal

1:50 – 2:05 **[514] The SAN Indexes Memory for Sound Objects Rather than Pitch Contour**
Christine Lefebvre, Pierre Jolicoeur
Université de Montréal

Cognition and Applications I

River Building 1200

12:50 – 1:05 **[515] Forty Winks Lessen the Blink**
Jason Ivanoff[1], Nicole Webb[2], Kabilan Thanapaalasingham[3], Benjamin Rusak[3]
Saint Mary's University[1], McGill University[2], Dalhousie University[3]

1:05 – 1:20 **[516] Embodied Numerosity in Chinese and Canadian University Students**
Kyle Richard Morrissey[1], Mowei Liu[2], Jingmei Kang[3], Darcy Hallett[1], Qiangqiang Wang[3]
Memorial University of Newfoundland[1], Trent University[2], Northeast Normal University[3]

1:20 – 1:35 **[517] Informational Affordances: Evidence of Acquired Perception–Action Sequences for Information Extraction**
Irene Reppa
Swansea University

1:35 – 1:50 **[518] The Impact of Disturbance Motion on Visual Spatial Working Memory**
Chris Nicholson, Ramy Kirollos, Jon Wade, Chris Herdman
Carleton University

1:50 – 2:05 **[519] Electrophysiological Correlates of Visual-Vestibular Integration**
Ben Townsend, Shannon O'Malley, Joey Legere, Martin von Mohrenschildt, Judith M. Shedden
McMaster University

Colloqium Session 2
(Sunday June 7th- 2:15 – 3:15 p.m.)

Developmental
River Building 2200

2:15 – 2:30 *[520] **The Emergence of the Motor Network in the First Year**
Jordynne Lydia Victoria Ropat[1], Annika Linke[1], Conor Wild[1], Charlotte Herzmann[1], Leire Zubiaurre-Elorza[1], Hester Duffy[1], David Lee[2], Victor Han[2], Rhodri Cusack[1]
Western University[1], Children's Health Research Institute (London, Ontario)[2]

2:30 – 2:45 [521] **Non-Symbolic Number Processing in Developmental Dyscalculia: Impairment of Production but not Comprehension**
Anne Lafay, Marie-Catherine St-Pierre, Joël Macoir
Université Laval

2:45 – 3:00 [522] **Doing What they Want Instead of What They are Taught: Methods of Division Used by Fourth and Fifth Grade Students**
Cheryll Fitzpatrick, Darcy Hallett, Nicole Pelley, Kyle Morrissey
Memorial University

3:00 – 3:15 [523] **Preschoolers' Development of Intent-Based Moral Judgment and the Role of Theory of Mind**
Katherine Andrews, Corrie Vendetti, Kate Carroll, Deepthi Kamawar
Carleton University

Cognition II
University Centre 180

2:15 – 2:30 [524] **Time and Time Again: Judgment Accuracy in Production and Reproduction of Time**
Janel Fergusson, Peter Graf
University of British Columbia

2:30 – 2:45 [525] **Applying an Exemplar Model to Implicit Learning of Conjunctive Rule Sets: Structure Emerges from Encoding Representations**
Chrissy M. Chubala[1], Brendan T. Johns[2], Randall K. Jamieson[1], D. J. K. Mewhort[2]
University of Manitoba[1], Queen's University[2]

2:45 – 3:00 [526] **Exploring Semantic Congruency Effects on Episodic Learning: Evidence from a Change Detection Task.**
Javier Ortiz-Tudela
University of Granada

3:00 – 3:15 [527] **Orthogonality of Imagined Spatial Reference Frames and the SNARC Effect**
Craig Leth-Steensen, Abeer Mourad
Carleton University

Memory II

University Centre 182

2:15 – 2:30 **[528] Reinterpreting Selective Impairments in Amnesia**
Evan Thomas Curtis, Randall Kenneth Jamieson
University of Manitoba

2:30 – 2:45 **[529] Context Reinstatement Does Not Influence Source Memory in Item Method Directed Forgetting**
Kathleen L. Hourihan .Angela Lundrigan
Memorial University of Newfoundland

2:45 – 3:00 **[530] An Effect of Perceptual Disfluency on Recognition: Blurry May be Desirable After All**
Tamara M Rosner, Hanae Davis, Bruce Milliken
McMaster University

3:00 – 3:15 **[531] Materials-Based Bias Effects in Old/New Recognition Memory**
D. Stephen Lindsay (slindsay@uvic.ca)
University of Victoria

Perception

River Building 1200

2:15 – 2:30 **[532] The Role of Auditory Feedback for Speech Motor Control in Individuals who Stutter**
Nichole E Scheerer, Jeffery A Jones
Wilfrid Laurier University

2:30 – 2:45 **[533] Audiological Hypersensitivity in the Post-Acute Phase of Sport-Related Concussions**
Hussein Assi[1], Christophe Alarie[1], Robert Davis Moore[1], Sylvie Hébert[1], Christine Turgeon[2], Dave Ellemberg[1]
University of Montreal[1], Université du Québec à Montréal[2]

2:45 – 3:00 **[534] Object Ownership: Measuring Associations Between Self-Concept and Owned Objects**
Nicole LeBarr, Judith M. Shedden
McMaster University

3:00 – 3:15 **[535] Lying Down Disconnects the External World**
Michelle L Cadieux, Kaian Unwalla, David I Shore
McMaster University

Colloqium Session 3
Sunday June 7th (3:30 p.m. – 4:30 p.m.)

Cognition and Applications II
University Centre 180

3:30 – 3:45 **[536] Can Journalistic "False Balance" Distort Public Perception of Consensus in Expert Opinion?**
Derek Koehler
University of Waterloo

3:45 – 4:00 **[537] The AttentionTrip: A Game-Like Task for Assessment of Attention Networks**
Tariq A Hassan, Raymond M Klein, Graham C Wilson
Dalhousie University

4:00 – 4:15 *[538] **Bullshit Proneness: Finding Meaning in Meaningless Statements**
Gordon Pennycook, James Allan Cheyne, Nathaniel Barr, Jonathan A Fugelsang, Derek J Koehler
University of Waterloo

4:15 – 4:30 **[539] The Brain in Your Pocket: Evidence that Smartphones Are Used to Supplant Thinking**
Nathaniel Barr, Gordon Pennycook, Jennifer A. Stolz, Jonathan A. Fugelsang
University of Waterloo

Language
University Centre 182

3:30 – 3:45 **[540] Semantic Access in Written and Spoken Word Comprehension: Evidence for Interactions Between the Time-Course of Stimulus presentation and modality**
Blair Armstrong, Manuel Perea, Arthur G. Samuel
Basque Center on Cognition, Brain, and Language (Spain)

3:45 – 4:00 **[541] Latent Semantic Incongruity in Written Puns**
James Gordon Boylan, Rod Martin, Albert Katz
University of Western Ontario

4:00 – 4:15 **[542] It's Just Not Processing: Investigating How Negated Language is Processed**
Alison Heard, Penny Pexman
University of Calgary

4:15 – 4:30 **[543] Experience as a Free Parameter in the Cognitive Modeling of Language**
Brendan Johns[1], Michael Jones[2], D. J. K.. Mewhort[1]
Queen's University[1], Indiana University[2]

Neuroscience II

River Building 2200

3:30 – 3:45 **[544 WITHDRAWN]**

3:45 – 4:00 *[545] **The Dorsal Diencephalic Conduction System in Reward**
Marc Fakhoury
University of Montreal

4:00 – 4:15 *[546] **Full Reversal of Cognitive Decline in Rat Model of Alzheimer Disease**
Edward N. Wilson, M. Florencia Iulita, Sonia Do Carmo, A. Claudio Cuello
McGill University

4:15 – 4:30 [547] **The Interaction Between Spatial Working and Reference Memory in a Radial Arm Maze with Rats**
Nicole Ann Guitar, William A Roberts
University of Western Ontario

Cognition III

River Building 1200

3:30 – 3:45 [548] **Dissociating Category Structure and Affective Ratings Using Promotion and Prevention Foci in a Categorization Task**
Jordan Richard Schoenherr
Carleton University

3:45 – 4:00 [549] **Publically Observable Feedback Modulates Speed of Processing in Video-Game Players**
James William Patten, Thomas M Spalek
Simon Fraser University

4:00 – 4:15 [550] **Inducing Reversals in Aesthetic Choices Through Contrast** Edward Zorry Belchev, Glen E. Bodner
University of Calgary

4:15 – 4:30 [551] **Direct Effects of Mindfulness Meditation Training on Cognitive Control**
Swapna Krishnamoorthy, Judith M Shedden
McMaster University

Poster Session 1

Friday June 5th 3:30 – 5:00 p.m.
Westin Hotel (Confederation II-III)

(**100**)

Calandra Speirs, Amanda Fernandez, Kristin Newman, Christopher Roy Sears (sears@ucalgary.ca)
University of Calgary

Age-related Differences in the Effect of a Sad Mood Induction on Attention to Emotional Information

This study examined the effect of a sad mood induction (MI) on attention to emotional images in younger and older adults. Participants viewed sets of four images (sad, threatening, positive, and neutral) while their eye movements were tracked and recorded throughout an 8-second presentation, before and after a sad MI. Consistent with previous research (e.g., Isaacowitz et., 2008), older adults exhibited positively biased attention, increasing their attention to positive images post-MI (a mood incongruent effect). Contrary to previous studies, younger adults also exhibited a mood incongruent effect, although the magnitude of the effect was smaller.

(**101**)

Brian Michael Bird [1] (bbird@laurentian.ca), Christian LaForge [1], Ryan Ferguson [1], Annie Roy-Charland [1], Fuschia Sirios [2]
Laurentian University[1], *Bishop's University*[2]

Is being thankful more than just good manners? Dispositional gratitude and attentional bias

Despite the ubiquitous finding that a grateful disposition is positively related to beneficial life outcomes, it is not clear what grateful individuals attend to in their environment in the first place—a concerning limitation, given that gratitude has been defined as the recognition and orientation towards the positive in one's life. The present study addressed this gap in knowledge by measuring baseline levels of gratitude in 60 undergraduate students, and subsequently monitoring eye-movements across an emotionally-variable scene perception task. Findings discuss how the definition of gratitude aligns with visual orientation towards affective stimuli.

(**102**)

Dana A Hayward [1] (dana.hayward@mail.mcgill.ca), Alexa Meilleur [1], Laura Andreea Seusan [2], Jelena Ristic [1]
McGill University[1], *The Hospital for Sick Children*[2]

Females search, males find: The effect of a distractor face on search depends on gender

We investigated whether visual search is affected by (i) the presence of a distractor face looking straight ahead, towards the target or away from the target, (ii) participant gender, and (iii) level of social competence. Participants searched for a target in a display of 4 or 12 items with a distractor face present in 80% of trials. Males found the target faster when the distractor face gazed at the target, while females found it slower in that same condition. Further, individual differences in social competence accounted for variability in search performance for female participants only.

(**103**)

Lucia Farisello (lfarisello@hotmail.com), Jacob Applebaum, Karine Elalouf, Jim G. Pfaus, Aaron P. Johnson
Concordia University

Sex Differences While Viewing an Erotic Video

Researchers investigating sex differences in attention to sexual stimuli mostly use static images. However, sex differences have not been explored in an ecologically valid context such as

video. Eye tracking was used to assess sex differences while viewing an erotic video. Eye movements were quantified using a within-isoline area. Data analysis suggests higher correlation (r=~.4) between sexes when viewing sexually explicit scenes, compared to less sexually salient scenes (r=~0). Compared to males, females show overall greater variance in eye movements throughout. Thus, sex differences may not be as evident as have been reported in still image studies.

(104)

Graham Olivier-Ross Albert (galbert744@community.nipissingu.ca)
Nipissing University

An Analysis of the Effects of Masculinized and Feminized Male Voices on Men and Women's Distractibility and Implicit Memory

In men, low-pitch voices often serve to attract mates. To date, research into vocal attractiveness appears to use only explicit voice ratings. This study used an irrelevant speech task to determine the extent to which men and women were distracted by masculinized and feminized male voices. Men implicitly processed more of the distracting, masculinized, irrelevant background speech than did women. This resulted in men's greater memory for masculinized background speech in a follow-up implicit memory task. However, women did not show greater attention to either voice. These results suggest that men may attend to dominance signals in other men's voices.

(105)

Deborah Anne Kathryn Martin (deborah.martin@mcgill.ca), Roberto G. de Almeida
Concordia University

Enhanced Local Processing in Autism: Evidence from Eye-tracking Dynamic Events

Individuals with Autism (ASD) may perceive information in more detail—by hypothesis, a superior local processing bias. ASD and typically developing (TD) children watched video clips of events and concomitantly listened to related sentences, while having their eye movements recorded. We were interested in understanding how verb and agent motion type enhanced attention to objects in scenes. Preliminary analyses indicate an interaction between group and verb type such that ASD children looked faster to the target object of more constraining causative verbs, suggesting greater sensitivity to sentence-scene interactions.

(107)

Deirdre Kelly (deirdre.kelly@carleton.ca), Jim Davies
Carleton University

A dual-process model of moral judgment: What psychopaths can tell us about morality

Traditionally, philosophers and psychologists have attempted to explain moral judgment using exclusively either reasoning or emotion approaches. A thorough investigation of psychopaths' use and understanding of morality, shows that neither approach can provide a full-blown explanation of psychopaths' moral judgment. Alternatively, we argue that what is required is a dual-process cognitive model of moral judgment which integrates both emotion and reason. Our box-and-arrow model offers a novel description of emotional processes in terms of specific social emotions such as guilt, sympathy, and fear for others. It also includes a broadened concept of moral reasoning which includes precautionary and social rules.

(108)

Sari Genny, Elana Isenstein (isensts@mcmaster.ca), Kelyn Jeanette Montano, David Russell Feinberg
McMaster University

Low Voice Pitch Predicts Sociosexual Attitude in Women

Testosterone predicts closed sociosexual behaviour among men but not women. Preferences for hormonally mediated traits like facial masculinity and voice pitch are associated

with more open sociosexual attitudes. The majority of this research has focused on men. We tested for relationships between sociosexual orientation and both men's and women's voice pitch. We found that low voice pitch is inversely related to sociosexual attitude, but not preference or behaviour, in women. If women's testosterone does not predict sociosexual attitudes, but voice pitch does, this suggests that the link between sociosexual orientation and voice pitch is psychological rather than physiological.

(109)

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Non-literal language and social cognition: A developmental relationship

The importance of different aspects of language for social cognition may change over development. The current study investigated the role of figurative versus structural language in social cognition in a younger and older sample of school-aged children. We found that structural, not figurative language was a significant predictor of social cognition in the younger group but that figurative, not structural language was a significant predictor in the older group. Our results indicate that the association between language and social cognition changes with development. This makes sense when we consider the increasing importance of figurative language for social competence in adolescence.

(110)

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Touching versus looking: The influence of different kinds of sensorimotor experience in children's word learning

According to theories of embodied cognition, sensorimotor interactions with the environment are essential for gaining and representing conceptual knowledge. In the present study, we examined the role of sensorimotor experience in children's language development by investigating the influence of interaction when learning nouns. In two experiments, five-year-old children learned labels for novel objects in different learning conditions which varied in sensorimotor experience. Following learning, children were given a recognition task. Contrary to predictions, we found that children learned labels equally well in all conditions. Possible explanations and the implications for theories of embodied cognition will be discussed.

(111)

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Response Set or Semantic Relation: Preschoolers' Performance on Three Stroop Tasks

The Day/Night Stroop (Executive Function) requires children to respond 'day' to a moon-picture and 'night' to a sun-picture. Simpson et al. (2012) argued that children err because the stimuli and responses share a response set, not because they are semantically related. Vendetti et al. (2015) argued that the Day/Night stimuli and responses are not strictly from the same response set and demonstrated that children make different kinds of errors on the Day/Night relative to other Stroop tasks, thus compromising its measurement of inhibition. We are testing this response-set hypothesis with three Stroop variants, assessing their measurement of inhibition in preschoolers.

(112)

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Improvements in Counting Speed in relation to Visual-Spatial Processes

In this paper we analyzed longitudinal changes (improvement) in counting speed for children (n=503) between the ages of 4 and 8 over three or four years using multi-level modelling. As

expected, children's counting speed improved dramatically over time. The pattern of change depended on children's visual-spatial span. At younger ages, children with higher scores on the visual-spatial span measure counted faster than those with lower scores. These results support previous work in which numeracy skills are more strongly linked to visual-spatial processes in younger than in older children.

(113)

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Attentional Switching in Bilingual and Monolingual Infants: An Eye Movement Study

The process of switching between two languages may equip bilinguals with enhanced cognitive control abilities. We examined infants' attentional switching capacities as function of their language environment in order to further understand the effect of exposure to bilingual environment on early visual cognition. Seven-month-old infants, raised in either a monolingual or bilingual environment, viewed stimulus cues presented randomly on a screen's center, each of which predicted a target appearing on either the left or right side of the screen during a pre-switch phase. During the post-switch phase, infants viewed the same cue and target stimuli but with a cue-target spatial predictability opposite to that experienced during the pre-switch phase. Infants' anticipatory eye movements were measured to see if infants could inhibit the cue-target spatial predictability learned during the pre-switch phase and switch attention and learn the new cue-target spatial predictability. Results revealed that bilingually-exposed infants' correct anticipations of the target were significantly higher than monolingually-exposed infants' during the last 50% of the post-switch phase. This finding suggests that infants exposed to a bilingual environment are better able to control and switch their attentional processing.

(114)

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Knowledge of semantic features in mild cognitive impairment

The study investigated the nature of semantic impairment in mild cognitive impairment (MCI) through a generation task (participants generated shared semantic features for word pairs) and a multiple choice task (participants selected shared features from four options). Stimuli were biological kinds and artifacts. Participants were healthy young (n=38) and older adults (n=39) and people with MCI (n=21). MCIs committed more errors overall, performing worse in the generation task and committing more superordinate errors than controls. The findings suggest greater loss of lower-level semantic features and a category-specific deficit for biological items in MCI, particularly for males.

(115)

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Phonological Processing and Executive Function Differentially Modulate Reading Comprehension Deficits in Schizophrenia and Developmental Dyslexia

Although clinically distinct disorders, schizophrenia and dyslexia both involve disrupted reading-related processes (e.g., language, oculomotor control). This suggests that reading may be similarly affected in both disorders. Recently, Whitford and colleagues (2013) demonstrated that impaired reading comprehension in schizophrenia related to deficits in executive function (antisaccade performance), but not with deficits in

phonological processing. Here, we found that readers with dyslexia had impaired antisaccade, phonological processing, and reading comprehension performance; however, reading comprehension was not related to antisaccade performance, but rather phonological processing (i.e., rapid letter naming). Thus, these factors may differentially modulate reading comprehension deficits in schizophrenia and dyslexia.

(116)

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Give me a verb! Give me a noun!: An ERP investigation of perceptual words with ambiguous word classes

Previous research has demonstrated that retrieving a verb from memory elicits different neural activity than retrieving a noun, but what about words that can be both? It has been found that the context surrounding a target word holds primary importance in the classification of a word. The first condition comprised of the words 'to' and 'the' preceding the target word, whereas the second condition was comprised of the word 'this' preceding or succeeding the target word. Event-Related Potentials were used to examine cognitive processes through a lexical decision task for manipulated words that are considered both verbs and nouns.

(117)

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Arbitrariness Isn't Set in Concrete: The Sound Symbolism of Concreteness

Contrary to the notion of arbitrariness, studies have demonstrated that certain phonemes seem inherently associated with certain kinds of meaning (e.g., Köhler, 1929). Several examples of non-arbitrariness have been explained via relationships between the articulatory properties of phonemes and associated information (e.g., Ramachandran & Hubbard, 2001). Here we investigated whether certain phonemes are inherently associated with either concreteness or abstractness. Using nonwords, we found that consonant phonemes involving a great deal of (lack of) tactile experience were associated with concreteness (abstractness). We also investigate this pattern in existing language corpora. These results demonstrate a novel sound symbolism effect for concreteness.

(118)

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The Impact of Text Difficulty on the Missing-Letter Effect

While reading and searching, participants omit more letters in frequent function words than less frequent content words. The impact of text difficulty on the missing-letter effect was examined. Predictions, based on the trade-off and familiarity effects, stipulate that an overall lower omission rate would be observed in an easy text since fewer resources would required for reading them, thus freeing resources for the detection task. Conversely, difficult texts would have more difficult content words, which would result in lower omission rates for content words in difficult than easy texts. Results indicate no impact of text difficulty on the missing-letter effect.

(119)

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Examination of question dependency in standardized reading comprehension tests

Studies have shown that questions from standardized reading comprehension tests can sometimes be answered correctly without reading the text. The current study examined whether other commonly used tests suffer from the same shortcomings as those previously studied. Furthermore, we explored if the issue is unique to multiple-choice questions. The WIAT includes open-ended questions, while the Nelson-Denny and the CAAT use multiple-choice questions. Participants were asked to answer the questions to the best of their knowledge without access to the texts. Results support the independency issue by showing that questions of all tests could be answered at levels superior to chance.

(120)

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The Impact of Familiarization Strategy on the Missing-Letter Effect

When reading and searching for a target letter, more omissions are observed in frequent function than rare content words. Studies that examined the impact of passage familiarity on the effect presented conflicting evidence. We examined the roles of passage familiarity and familiarization strategy on the missing-letter effect. Participants, first, retyped the text, replaced common nouns with synonyms, or generated a text on the same topic and, then, completed a letter search task. Results revealed fewer omissions for retyping and synonyms conditions. The missing-letter effect was maintained in familiar and unfamiliar texts with an overall reduction of omissions in familiar texts.

(121)

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The Effect of Diacritic Marking on the Speeded Visual Recognition of French Nouns

The effect of adding or removing the diacritic marks on the visual recognition of French nouns was investigated in two experiments. Lexical decisions were recorded to high- and low-frequency intact nouns carried letters e, é or è and their altered forms where accents were added or removed. The results indicated that a) responses to nouns were faster and more accurate when the required accent was present rather than absent and when their frequency of use was high; b) responses to nonwords were less accurate and slower when they carried an accented e and when they were derived from low-frequency nouns.

(122)

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Tip-of-the-Tongue States: The Role of Repeated Information in The Error Repetition Effect

This study examines the nature of the information recalled during repeated tip-of-the-tongue (TOT) states, in which a speaker's TOT state can be shown to reoccur for individual words, despite being told the correct answer (Warriner & Humphreys, 2008). This study elicited TOTs from participants, from the same definitions a week apart, while they spoke aloud their thoughts. We measured the tendency for TOTs to repeat, and the nature of the information recalled. Of most interest is the extent to which information repeats. This tells us whether the TOT state is better described as specific local minimum, or a general sub-threshold retrieval state.

(123)

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Heuristic mechanisms in sentence processing

In previous behavioural and ERP work, we proposed that quantifier scope ambiguous (QSA) sentences of the form Every kid climbed a tree were processed using a fast-and-frugal, heuristic mechanism. That is, readers do not "deeply" interpret QSA sentences using algorithmic (grammatical) rules, thereby disambiguating whether just one tree was climbed, or several. In the current self-paced reading study, an additional "pre-context sentence" was added in order to facilitate in-depth processing of QSA sentences. Results from 48 participants revealed that the additional context did not alter the primary language processing mechanism; RTs were still compatible with heuristic strategies.

(124)

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The Impact of Clef, Pitch and Frequency of Occurrence on Visual Note Identification

Factors affecting visual note recognition have been studied through a naming task of individual musical notes. Two tasks were used to investigate: a) the impact of pitch using a range of 28 distinct notes; b) the impact of clef alternation using homogeneous and heterogeneous lists. The results indicated that notes were more accurately and quickly identified when the notes: a) were presented in Treble clef rather than Bass clef; b) were presented in a homogeneous list rather than heterogeneous list; c) were located close to the middle C; d) had higher frequencies of occurrence in piano teaching materials.

(125)

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The Effects of Stimulus Quality on Reading Aloud: A New Dissociation

In previous work, stimulus quality affects both high and low frequency words to the same extent when mixed with nonwords. The best account to date is that this is because the system tries to prevent lexicalizations by thresholding a pre-lexical level, thereby restricting the effects of low stimulus quality to that level. The question addressed here is whether this thresholding reverts to cascaded processing when pseudohomophones (e.g., "BRANE" for "BRAIN") are substituted for the nonwords and participants are told that these items sound identical to real words.

(126)

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Lexical processing of skipped words in reading

In reading, lexical processing of skipped words is debated. The E-Z Reader model postulates that a word cannot be skipped unless its lexical processing is fully completed, while the SWIFT model suggests that full lexical processing is not necessary. Using an eye contingent display, this study tested the level of lexical processing of skipped words by manipulating the characteristics of the words in the parafovea. Results showed that the French polysemous word les is fixated more often than the article des, even though the latter is less frequent. These results suggest a deep lexical processing of skipped words.

(127)

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Orthographic Knowledge in Beginning Spellers

An important aspect of early spelling development involves sensitivity to orthographic regularities (i.e., permissible letter sequences) that exist in the English language. The present study examined the extent to which good and poor spellers (as determined by a standardized spelling task) in Grade 1 are sensitive to a number of orthographic patterns that vary with respect to linguistic complexity. Compared to poor spellers, good spellers demonstrated greater overall orthographic knowledge, as well as greater sensitivity to linguistic complexity. Theoretical and practical implications of these findings are discussed.

(128)

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Speech sound regularities: Adults track syllable position and co-occurrence information

Languages display sound-position regularities (in English NG ends but cannot begin syllables) to which adults are sensitive. Adults heard repeating nonwords with contraints on medial consonants (e.g., codas: F, Z; onsets: P, D; co-occuring: FP, ZD as in baFPek, kiZDev). False recognition was higher for novel nonwords that maintained (kiFPeb; kiFDeb) than violated (kiPFeb; kiDFeb) syllable-position constraints, whether or not local co-occurrences were maintained; and for novel nonwords that maintained than violated local co-occurrences if syllable-position constraints were maintained (kiFPeb vs kiFZeb). Results suggest the simultaneous availability of hierarchical phonotactic representations in which co-occurrence information is nested within syllable-position information.

(129)

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The Effect of Sense Relatedness in Older Adults and Patients with Mild Cognitive Impairment or Early Alzheimer's Disease using Event-Related Potentials

People diagnosed with mild cognitive impairment (MCI) and Alzheimer's disease (AD) experience a decline in semantic processing. Our study collected data from 29 healthy older adults, 8 MCI and 3 early AD participants. Participants performed lexical decisions on words with many related senses (e.g. chicken) and words with few related senses (e.g. guitar) while EEG was recorded. High-sense words elicited shorter response times, and smaller N400 and larger late positive complex amplitudes than low-sense words in patients and control participants. The results may indicate that people with MCI and AD have a preserved semantic network early in the disease course.

(130)

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Linguistic Learning Simulation Using Associative Neural Networks: A Context-Free Study

Numerous studies have attempted to recreate human linguistic learning through connectionist networks, using contextual cues to match graphemes (written word units) and phonemes (sound units). This study attempted to obtain similar results without the added help of context. Although only 60% of all possible French linguistic associations could be used in a context-free environment, 94% of selected associations were learned by the network, with strongly-correlated associations being the most difficult to assimilate separately. Such results suggest that language learning is partly context-free, and mark a promising step towards developing more process-rich models incorporating multiple facets of human learning.

(131)

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The effects of writing disfluency on lexical features of essays

Recent studies (e.g., Alves et al., 2014) have suggested that decreased translating fluency (i.e., slower typing speed) has a detrimental effect on essay quality. In a series of experiments, we manipulated translating fluency and explored its effects on lexical sophistication, sentence complexity, and cohesion of essays (thee important indicators of successful writing; e.g., Crossley & McNamara, 2012). Results are inconsistent with the idea that decreased fluency is necessarily related to lower essay quality. Discussion focuses on the potential mechanisms underlying these effects.

(132)

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Recognition of foreign phonemic sequences by pre-adolescents, adolescents and young adults: Evidence for a sensitive period?

Pre-adolescents (8.08 years, SD 0.52), adolescents (12.83, 0.76), and young adults (20.17, 1.03) (all N = 16) identified phonemic strings (English-non-words, and English, Portuguese and Chinese words) as English/non-English, then performed a surprise recognition task. Performance on both tasks increased with age: $F(2, 42) = 4.17$, $p = .02$, $\eta^2 = .17$; $F(2, 36) = 10.57$, $p < .001$, $\eta^2 = .37$ respectively. Recognition performance showed less disadvantage for foreign than native strings for pre-adolescents compared to older groups (age x language interaction linear trend approaching significance, $F(2, 36) = 3.17$, $p = .054$, $\eta^2 = .15$)

. (133: WITHDRAWN)

(134)

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Prospective Memory in Aging, Mild Cognitive Impairment, and Alzheimer's Disease

Prospective memory (PM) refers to the process of executing planned actions in accordance with a specific time or place. PM declines with normal aging and more so in the presence of cognitive impairment. The current study compared performance on a traditional PM task as well as a more ecologically valid PM shopping task in individuals with Mild Cognitive Impairment (MCI), early Alzheimer's disease (AD), and cognitively healthy older adults. Preliminary results indicate that the shopping task discriminated between those with MCI and AD. Findings may facilitate early diagnosis and

development of strategies to improve everyday PM performance.

(135)

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Introducing SuperPsychToolbox: an open-source tool to facilitate coding and analysis of psychology experiments

Available experiment software presents trade-offs among ease of use, reliability, cost, and experimenter control. Consequently, our laboratory constructed SuperPsychToolbox, an open-source, experiment-level layer for the popular PsychToolbox in Matlab. To gather a keystroke, verbal utterance, typed response, or mouse/tablet/eye-movement trajectory, a single line of code is required; highly detailed response data are then logged in standard form. With a second line of code, our toolbox generates intelligent data summaries and group analytics. Broadly, our well-tested code helps laboratories focus on conceptual problems in psychology, rather than error-prone response sampling or manual data organization, and brings the design, execution and analysis of complex experiments within the scope of a one-semester project course.

(136)

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Mentoring Matters: Why Undergraduate Psychology Students in Canada Need Mentorship

A common goal of university administrators is to identify support mechanisms to improve the higher-education experience of students in Canada. Undergraduate students in psychology often report feeling unsupported in their developmental trajectory as students. Peer mentoring enables less experienced students to navigate through their education in a supportive and guided way and is regarded as an effective intervention meeting these objectives. Across the extant literature, researchers have found that formal peer mentorship opportunities for undergraduate students are scarce. This poster highlights the current status of study in this area, limitations in its knowledge, suggested practical implications, and future research directions.

(137)

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Believing is Doing? Weighing the Costs and Benefits in Responding to Emotionally Evocative Situations

Little is known about how beliefs about emotion regulation (ER) predict choice of ER strategies in negative situations. The present study examined the relations among beliefs about the benefits and costs of functional and dysfunctional ER strategies, strategy choice, and psychological well-being, in 108 undergraduate participants. The belief that functional ER is beneficial to well-being was associated with happiness, life satisfaction, and adaptive strategy choice. A mediation analysis confirmed that strategy choice partly mediated the relation between beliefs and well-being. Believing that dysfunctional strategies are beneficial for well-being predicted less adaptive strategy choice, but was not related to well-being.

(138)

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Sub-maximal aerobic exercise: a therapeutic approach for prolonged concussion symptoms

Many concussed individuals experience symptoms beyond the acute phase of the injury. Currently, there is no standard treatment for prolonged symptoms, but exercise protocols exhibit therapeutic promise. This study evaluated the efficacy of a gradual exercise protocol, which obviates the need to induce

symptoms. Ten patients completed the exercise protocol (28.8 days (±15.1). Participants reported significantly fewer symptoms (pre-10.6; ± 4.7; post-2.01; ± 2.1) and a reduction of overall mean intensity of symptoms (pre-28.00; ± 17.2; post-3.0; ± 2.9) from pre-to-post intervention. These results suggests that a gradual exercise protocol can be used to decrease symptomatology without re-inducing symptoms.

(139)

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Quanty: An online game for eliciting the wisdom of the crowd

Quanty is an online game that anonymously pairs players to estimate distances, weights, sizes, frequencies and such from photographs. The degree to which players agree determines the number of points they receive. We hypothesized that this game would generate more accurate aggregated estimates than would singular estimates by exploiting the wisdom of the crowd. Ninety-six participants (50 in group 1 using the metric system, and 46 in group 2 using the non-metric system) estimated height, weight, and distance of various objects; aggregated estimates of each group were more likely to approach accurate answers than were individual estimates, especially when the aggregates were calculated using medians and median absolute deviations. Also, the majority of participants thought that the game was as fun as the popular game Tetris. The results suggest that Quanty can be used to improve the judgment accuracy of professionals.

(140)

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Restoring land and mind: The benefits of an outdoor walk on mood are enhanced in a naturalized landfill area versus its neighbouring urban area

Old landfills are being converted into naturalized green spaces but little is known about how exposure to such areas affects mood, cognition, and physiology. Here, using a pre-post, within-subject design, we found that walking through a naturalized landfill improved participants' positive mood, energy, and attentional control, and decreased their concentrations of cortisol (a biological marker of stress). Further, the improvement in mood was significantly greater than the improvement in mood found after walking through a neighbouring urban area. Therefore, the naturalization of landfills may benefit its users and improve the quality of life in urban areas.

(141*)

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When your past influences your present: History of object placement affects human spatial organization

A popular idea among scientists and designers alike is that people organize their space in order to minimize effort, though this hypothesis has largely been under-examined. We provide an experimental test of this effort minimization idea by assessing whether individuals in fact choose to place more frequently-used objects closer to them. Interestingly, we found no evidence for this intuitive hypothesis. Instead, there was strong evidence that individuals tended to arrange objects based their spatial history (i.e., where the object had been in the past). Implications for a more comprehensive understanding of human spatial organization will be discussed.

(142)

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Individual differences predict emotion regulation choices and subsequent psychological well-being

Much research has looked at the consequences of emotion regulation, but little is known about individual differences as predictors of healthy emotion regulation and subsequent well-being. In the current study, 94 undergraduate participants completed questionnaires assessing general hedonic and eudaimonic motives, distress tolerance, beliefs about ability to regulate emotions, tendency to discount delayed rewards, and emotion regulation choices. All variables, apart from delay discounting, were significant predictors of adaptive emotion regulation choices, which in turn predicted well-being. Results suggest that these individual tendencies may be an avenue for altering strategy choice to facilitate healthy emotion regulation.

(143)

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Determining mean heart rate at symptomatic threshold in post-concussion syndrome

Aerobic exercise could be promising for rehabilitating post-concussion syndrome. However, triggering/exacerbating symptoms through exercise can impede recovery and deter adherence. We determined the mean heart rate at which aerobic exercise triggers/exacerbates symptoms in individuals suffering from post-concussion syndrome to establish a personalise metric of exercise intensity and ultimately avoid this symptomatic threshold. Eighteen concussed individuals (23,3yrs, ±5,7) reporting persisting symptoms had a mean heart rate of 118,6 BPM (± 19,1) at symptomatic threshold, corresponding to 38,8% (±14,6) of heart rate reserve. Therefore, the individualised calculation of heart rate reserve could allow avoiding symptomatic threshold in exercise rehabilitation protocols.

(144)

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Social Interest and Emotion in Relation to Motives for Volunteering

Previous literature demonstrates a strong relationship between social interest and well-being, however motives for volunteering that are characteristic of social interest have been relatively unexplored. To assess this relationship, 92 undergraduate psychology students completed questionnaires assessing social interest, social desirability, emotional well-being and motives for volunteering (altruistic or selfish). It was found that individuals with high social interest are more likely to volunteer for altruistic reasons and have better emotional well-being. Results are discussed in terms of Adler's concept of social interest and its connection to mental health.

(145)

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A Collection of Emotional Movie Clips

Most current experimental movie clip sets include well-known Hollywood films. However, these clips' familiarity can influence participants' emotional responses, attention, and memory. Our aim is to develop an affective movie clip set containing brief clips extracted from obscure movies. Ratings of valence, arousal, and familiarity were gathered for 95 initial clips from 51 participants. We found significant differences in valence and arousal for positive, negative, and neutral clips, validating our selection. Low ratings of familiarity indicate the clips were generally novel.

(146)

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The effects of income, looks, intelligence, and devotion on short-term dating preferences in an online setting

This study examined female undergraduate preferences when considering a short-term partner in an online dating setting. Participants rated their likelihood to engage in a "one-night-stand" or "fling" with a set of male online dating profiles that varied orthogonally in terms of looks, intelligence, income, and devotion-level. Contrary to self-report studies indicating preferences are influenced primarily by looks and income (Goetz, 2013), we found main effects for all four factors. Additionally, intelligence, income and devotion interacted, the result being that prospective partner income levels exerted influence on a participant's tendency to attend to intelligence and devotion levels. Interestingly, male participants asked to indicate how they believed heterosexual females might respond largely mirrored the female responses, a sign that males are, to some extent, aware of female short-term selection preferences.

(147)

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Task-Irrelevant Contextual Cues Can Bias the Content of Mind Wandering

Mind wandering is typically characterized as spontaneous task-unrelated thought separate to the current context, with substantially reduced or absent information processing for the external environment. A small number of studies have shown that high-value personally-relevant external information can influence MW; we ask whether irrelevant external influences may also influence MW. Participants initially rated negative and positive emotional pictures against coloured backgrounds. When task-irrelevant coloured backgrounds were present during Flanker and metronome timekeeping tasks, these arbitrary colour-affect associations influenced rate and affective content of off-task thought. We discuss implications for models of MW.

(148)

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Norm Diffusion in Scientific Social Networks: Adoption of Scientific Integrity Norms by Academic Institutions

Collective decision-making within social networks provides one means of examining judgments made in ecological settings. In the present study, a sample of academic institutions in the United States was examined to determine whether a passive social contagion process or compliance with central advisory and regulatory institutions accounted for the pattern of adoption of scientific integrity policies. Replicating the methods of previous studies response curve fitting was use to model the diffusion process. Model fits suggested that both social contagion and compliance processes appear to account for the adoption pattern we observed corresponding to shared decision-making in an equivalent Canadian institutional network.

(149)

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Students' use of online resources and their grades in an introductory statistics course

We examined the relationship between students use of online resources and their course performance in an introductory statistics course. The course website provided lecture slides, mini lecture videos, self-assessment quizzes, assignments, and other materials used in the course. The self-assessments and assignments (all required) provided students with immediate feedback on their performance. Students were able to re-study the material and to re-attempt the self-assessment or assignment for better

grade. Four in-class exams assessed students' progress in learning the course objectives. Students use of online resources were very strong predictors of both their exam as well as their final course grades.

(150)

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Carleton University

Psychopathic traits and perception of ambiguity in emotional stimuli

Psychopathy is a personality disorder that in its extreme form is characterized by shallow affect and impulsive behaviour. We investigated an emotion-processing deficit hypothesis for psychopathy by presenting individuals varying in psychopathy three types of emotional stimuli – spoken words, facial expressions, and cross-modal stimuli (emotional faces + voices) – that differed in how clearly the emotion information was portrayed. Emotion identification accuracy across the three stimulus conditions did not vary by psychopathy when the stimuli were unambiguous. However, emotion identification for the ambiguous versions of the faces and crossmodal stimuli was less accurate for individuals with higher levels of psychopathy.

(151)

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Don't listen to your heart: The relationship between affective intuition and cognitive performance

The Types of Intuition Scale (TIntS; 2014) proposes that an individual's intuitive judgements can be affective, inferential or holistic in nature. Affective intuitions are based on emotional reactions while inferential intuitions are based on analytical processes that have become automatic. Holistic intuitions integrate multiple sources of information. The current study sought to examine the relationship between types of intuition and performance on tests of cognitive ability. Preference to rely on affective intuition (but not inferential or holistic intuition) was associated with lower fluid intelligence, reduced working memory span, and poorer performance on the Cognitive Reflections Task and base-rate neglect problems.

(152)

Stephen D. Smith (s.smith@uwinnipeg.ca), Michelle S. J. Di Nella
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Is Theory of Mind Dependent Upon Language Abilities?

Theory of mind (ToM) refers to the ability to recognize that individuals have mental states such as beliefs, perspectives, and emotions that guide their behaviour. However, existing measures of ToM might be dependent upon linguistic skill. In the current study, participants completed five traditional ToM tasks as well as a novel, non-linguistic, test of ToM. They also completed tests of vocabulary and passage comprehension. Performance on the ToM tasks was significantly correlated for most measures. However, seven of ten correlations disappeared when language abilities were statistically factored out, suggesting that language skills are mediating ToM performance on many tasks.

(153)

Cindel White (cindelwhite@hotmail.com), Chad Buckland, Marcie Penner-Wilger, Graham Broad
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Historical Cognition: Cognitive Biases in Historical Reasoning

We examined the cognitive underpinnings of historical thought. Undergraduates read about Pearl Harbor and September 11, 2001, generated causal explanations for these events, and evaluated their own explanations and several given explanations, including historically conventional and conspiracist explanations. Students were more satisfied overall with conventional explanations, but generated more and were more satisfied with conspiracist explanations for 9/11 than for Pearl Harbor.

Students with greater previous knowledge and more satisfying explanations viewed Pearl Harbor as more foreseeable, demonstrating hindsight bias. These results indicate that students were biased by their previous knowledge and ability to produce satisfying explanations for historical events.

(154)

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Remediating Intuitive Statistical Biases: The Effect of Practice and Feedback

People can intuitively (i.e., informally) compare groups of data and make appropriate judgments about them. However, people tend to overemphasize the differences between the means of the groups relative to the variation within the groups, which can lead to errors in judgment. The present research investigates people's intuitive statistical capabilities using a novel computer-based measurement tool. Further, this research explores the effectiveness of a brief computer-delivered practice-and-feedback-based educational intervention on remediating subject's intuitive statistical reasoning biases. The results are discussed with respect to implications for statistical reasoning and educational interventions.

(155)

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Intuitive Statistical Reasoning: Improving Students' Understanding of Normative ANOVA Logic

This present research aims to explore the effectiveness of two educational interventions designed to develop students' informal inferential reasoning and improve their ability to make accurate informal statistical inferences. A modification of Trumpower's (2011) assessment tool tests the efficacy of these interventions. One intervention is a series of instructions based on an everyday example of informal statistical reasoning (comparing product ratings on Amazon). The other is an interactive computer task designed to foster a deeper understanding of important data characteristics that are involved in statistical reasoning. Results are interpreted with respect to implications for statistics education.

(156)

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Carleton University

Argument complexity: Teaching undergrads and fighting terrorism

We present the argument complexity scale, a tool for analyzing the complexity of argumentation, adapted from the integrative complexity and conceptual complexity scales from, respectively, political psychology and personality theory. Argument complexity classifies arguments based on three traits: acknowledgement and consideration of conflicting evidence or frameworks, use of frameworks for evaluating evidence, and use of meta-frameworks for evaluating frameworks. We discuss how the argument complexity scale can be used both to teach undergraduate students to reason and write like academics and to better understand how to counter violent radical narratives.

Poster Session 2

Saturday June 6th (11:30 a.m. – 12:55 p.m.)
River Building 2220, 2224, 2228

(**200**)

Kathleen Oliver (oliverlk@mcmaster.ca), Karin R. Humphreys
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The Effect of Age and Alzheimer's Type Dementia on Error Repetition in Tip-of-the-Tongue States.

Older adults experience more tip-of-the-tongue (TOT) states than young adults (e.g. Burke et al., 1991). TOT states in young adults can reoccur for individual words, despite being told the correct answer (Warriner & Humphreys, 2008). This is referred to as an error learning effect. It is unclear as to what extent older adults with and without dementia exhibit error learning. We elicited TOTs from older adults across retirement homes in Hamilton, Ontario, from the same definitions a week apart. Cognitive impairment was measured using the Montreal Cognitive Assessment (MoCA). We measured the tendency for TOT states to repeat and whether or not age and/or MoCA scores can predict error learning.

(**201**)

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The effects of physical activity on cognitive flexibility in aged rats.

'Pattern separation', describes the ability to distinguish highly similar events, experiences or locations from one another and adult hippocampal neurogenesis plays an important role in this process. Cognitive flexibility can be related to pattern separation as it describes the ability to inhibit previously learned rules and to rapidly and flexibly learn a new yet similar rule. Experimentally suppressing adult hippocampal neurogenesis by chemotherapy treatment, X-irradiation and by genetic manipulation has been shown to adversely affect cognitive flexibility. We investigated whether age-related suppressed adult hippocampal neurogenesis is associated with cognitive inflexibility and whether physical activity can reverse this effect.

(**202**)

Sandra L. Wright (swright@grenfell.mun.ca), Miranda Benoit, Matthew L. Ingram, Christina Thorpe, Darlene M. Skinner, Gerard M. Martin
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The role of direction, distance, weight and light cues in memory retrieval.

Both direction cues and changes in room cues can support response reversal learning in rats. However, rats do not appear to use distance cues to support response reversal learning, despite being able to use these cues in discrimination tasks. We further examined rats' capacity to use distance cues and compared performance with rats' capacity to use texture, weight and light cues. It appears that rats can use these cues, to varying degrees of success, in discrimination tasks even though they do not support response reversal learning. These findings indicate that direction cues may serve a privileged role in memory retrieval.

(**203**)

Manon Maheux (manon.maheux@umontreal.ca), Pierre Jolicoeur
Université de Montréal

Effect of Ageing on Visuospatial Attention and Visual Working Memory: An ERP Study.

The N2pc and the SPCN (sustained posterior contralateral negativity) are two well-known event-related potentials (ERPs) linked to visuospatial attention and visual working memory. However, little is known about the effects of ageing on them. A flicker photometry

task was used to adjust the luminance of the stimuli for each participant, allowing us to compensation for the physical ageing of the eye. An overall lower luminance was used for younger participants. We examine the effect of ageing on the amplitude and latency of both components. Results show a delayed latency for the older participants.

(**204**)

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Numerical Context and Time Perception: Contrast Effects and the Perceived Duration of Numbers.

We examined how the contextual repetition of magnitude information presented in either symbolic (Arabic digits), or non-symbolic (numerosities) notations impacted the perceived duration of a later occurring target number. A time-magnitude bias was demonstrated as, on average, large magnitude targets were judged as lasting for longer durations relative to small magnitude targets, regardless of notation. Furthermore, context effects were demonstrated but found to be asymmetrical, occurring only for large magnitude targets. Additionally, the type of context effect was shown to be determined by whether the context was presented in the same notation as the target, or a different notation.

(**205**)

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Université Laval

Eyes Have Ears: Pupil Dilation as an Index of Auditory Attentional Capture.

The rare occurrence of a sound deviating from the auditory background tends to trigger attentional orienting and a group of sympathetic physiological responses. This study aimed to assess whether pupil dilation, another sympathetic-associated response, can also reflect auditory attentional capture. Since pupil dilation is known to be modulated by environmental factors such as luminance, the pupillary response to to-be-ignored standard and deviant sounds was measured while participants performed a reading task. Analyses showed that deviants triggered larger pupillary responses than standards, suggesting that the pupil dilation can index the orienting response toward deviant sounds even during active visual processing.

(**206**)

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University of Ottawa

ERP Effects of Number of Associates and Semantic Neighbours in a Lexical Decision Task.

Semantic richness is a multidimensional and dynamic construct that can be defined as the amount of semantic information a word possesses. We investigated two dimensions of semantic richness, Number of Associates (NA) and Number of Semantic Neighbours (NSN), using lexical decision (LDT) and semantic categorization tasks, while EEG was recorded. High-NA and high-NSN words elicited a smaller N400 than low-NA and low-NSN words, but only in the LDT. These results suggest that high-NA and high-NSN words may engender lower processing demands than those with low NA and NSN, and may thus be easier to integrate within the neural semantic network.

(**207**)

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University of Western Ontario

Are there feelings in feelings-of-knowing?

Guided by the framework that autonomic feedback shapes cognitive processing, we asked whether feeling-of-knowing (FOK) judgments are informed by feelings. Participants performed a FOK task for episodically-defined face-name pairs while changes in cardiovascular activity

during retrieval were recorded. Critically, the relationship between the pattern of cardiovascular activity at retrieval and FOK ratings was moderated by participants' ability to perceive their heartbeat, such that greater increases in cardiac rate for old relative to novel items were associated with a larger corresponding difference in FOK ratings for participants with high interoceptive awareness. Therefore, FOK judgments appear to be shaped by autonomic feedback.

(**208**)

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Mount Allison University

The Effects of Object Similarity and Conguency on Visuo-Haptic Recognition.

Our perception of the world includes integrated objects coming from all senses, yet some senses are weighted more heavily than others. We evaluated how vision and touch are integrated when identifying novel objects. Undergraduate participants learned to identify novel objects visually, haptically, or bimodally. Once all objects were correctly identified visually and haptically, participants were simultaneously presented with two objects that were congruent or incongruent and asked to identify either the visually-presented object or the haptically-presented object. Object similarity had similar effects in visual and haptic identification. The interference observed during incongruent trials depended on both learning and testing conditions.

(**209**)

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Nipissing University

Social Phobia and Emotional Faces: What are you thinking? Is it about me?

Generalized social phobia (GSP) is characterized by negative interpretations of interactions with unfamiliar people and fear of social scrutiny. Although distorted mental state attributions are assumed to underlie GSP, brain imaging evidence for this proposal is very limited to date. In this functional magnetic resonance imaging study, 11 GSP participants generated greater neural responses (relative to 11 healthy comparison participants) in the medial prefrontal cortex to emotional faces, and greater and unique responses in the temporo-parietal junction to disgust faces. These brain imaging results are interpreted as reflecting exaggerated self-relevant processing and disgust-specific concerns of social rejection.

(**210**)

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McGill University

Neural Representation of Emotion across Modalities.

We used an fMRI adaptation paradigm to investigate the neural correlates of auditory and visual emotional information processing. BOLD signal was acquired with a fast multiband acquisition technique (TR=529ms). This technique aims to identify to what extent overlapping activation clusters may be produced by common neuronal populations. Preliminary analysis revealed, as expected, sensory (visual vs. auditory) and category-specific (e.g., music vs. speech) adaptation effects in regions previously implicated in the processing of these stimulus types. Overall, our results confirm the usefulness of this paradigm, together with newly developed MRI techniques, to investigate the neural bases of processing of emotional expressions.

(**211**)

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Difficulties with exploratory behaviour following right brain damage.

Research has demonstrated that right brain damage (RBD) impairs the ability to update to environmental changes. We propose these impairments stem from an impoverished ability in patients to effectively explore their

environment. We present results from two tasks in which RBD patients were required to learn and adapt to unannounced changes in probabilistic environments. In both tasks, RBD patients demonstrated difficulties updating to switches in their environment. Additionally, patients showed poor efficiency in their exploration of task possibilities. We propose that updating impairments observed following RBD could be due to an inability to efficiently explore alternative hypotheses in their environment.

(212)

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Empathy traits and emotional regulation relate to motor cortex excitability during the observation of emotional images.

Empathy traits reflect a propensity to share experiences (e.g., emotions) of others. The ability to regulate emotions, encompassing skills such as awareness of one's emotions, may be closely linked to empathy. Emotional regulation is also known to engage the motor system for actions. We investigated changes in corticomotor excitability with transcranial magnetic stimulation in young participants (8 men, 8 women) while viewing images with emotional or neutral content. We found that empathy traits and emotional regulation were correlated with the relative change in the amplitude of motor evoked potentials computed when contrasting modulation for viewing emotional content with neutral content.

(213)

Kyle Logie [1] (kyle.logie-hagen@mail.mcgill.ca), Simon Rigoulot [1], Pierre Jolicoeur [2], Jorge L Armony [1]
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Processing of Emotional Auditory Stimuli: A MEG Approach.

We investigated the processing of emotional (sad, happy, fearful or neutral) auditory stimuli using Magnetoencephalography (MEG). Participants (N=21) listened to short musical excerpts played with saxophone, piano or violin, as well as human vocalizations. Source localization (dSPM) revealed significant differences in spatial and temporal activation patterns between vocalizations and music, particularly within the temporal lobes, consistent with previous fMRI results. These differences were mainly driven by piano. In contrast, violin elicited similar patterns in magnetic signal to those of vocalizations. In terms of emotion, the largest differences were observed between happy and sad stimuli.

(214)

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University of Regina

What's in a line? The influence of valence, faces, and language on pseudoneglect.

The line bisection task is a simple and effective measure of visuospatial bias. Pseudoneglect, a leftward bias, is typically found on this task, and appears to result from right hemisphere dominance for spatial processing. In the present study (n=52) we examined the influence of other lateralised processes (emotion, language, and face processing) on line bisection performance. Line type (face, word, solid), valence (positive, negative, neutral), and hand use (left, right, both) were manipulated. Results indicate that line type and valence interact to affect the extent of pseudoneglect. The implications for pseudoneglect research are discussed.

(215)

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Western University

A Translational Rodent Model of Cognitive Bias.

The phenomenon of negative cognitive bias, perceiving ambiguous information in a negative manner, is a key component of stress related neuropsychiatric disorders (ex. depression). In our novel behavioural test, rats were first trained

to associate reward/aversive outcomes with specific contextual cues. Then, following neutral/pharmacologically induced stress and an intermediate contextual cue, a rat shows positive cognitive bias if it chose the outcome normally associated with the reward. We observed significant negative bias displayed by the stressed animals. This test constitute a valuable translational tool to investigate the underlying mechanisms of cognitive bias, and may allow for advances in neuropsychiatric pharmacology.

(216)

Denis M. J. Gavigan, Laurie Sykes Tottenham (laurie.sykestottenham@uregina.ca)
University of Regina

Do stress responses mediate the relationship between math anxiety and math performance?

We investigated potential mediating effects of sympathetic and hypothalamic-pituitary-adrenal (HPA) stress responses on the relationship between math anxiety (MA) and math performance (MP). Participants (n=31) completed a MA scale and math task; heart rate and salivary cortisol were measured to index the sympathetic and HPA responses (respectively). MA significantly predicted MP and heart rate, but not cortisol. Heart rate marginally nonsignificantly predicted MP (p=.07) while controlling MA, which remained a significant predictor of MP; cortisol did not predict MP. Results suggest the sympathetic stress response may partially mediate the relationship between MA and MP, while the HPA response does not.

(217)

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McGill University[1], *International Laboratory for Brain, Music and Sound*[2], *Research Université de Montréal*[3]

Cortical responses to Social Auditory and Visual Stimuli: A functional Near-Infrared Spectroscopy (fNIRS) Study.

We investigated whether functional near infrared spectroscopy (fNIRS) can be used to measure reliably and differentiate responses to complex social visual and auditory information. Healthy participants were presented with alternating blocks of auditory (voice and music) and visual (faces and body expressions) stimuli while their brain activity was recorded with a 32-channel fNIRS system covering the left temporal and occipital lobes. Analyses revealed reliable hemodynamic responses in distinct regions of visual or auditory cortex for corresponding visual or auditory stimulation that corresponded well with those observed in a related fMRI study using the same stimuli.

(218*)

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McGill University[1], *University of Michigan*[2]

Behavioral and neural consequences of hearing the past and the future during music performance.

We investigated sequential planning processes by presenting future- and past-oriented auditory feedback during music performance. Pianists memorized isochronous melodies and performed from memory while electroencephalography was recorded. Auditory feedback contained altered tones that matched a Future pitch (next intended event) or a Past pitch (preceding event). The timing of produced tones slowed following Future (not Past) feedback, and greater slowing was associated with larger N100 amplitudes one tone after the Future feedback. Both Future and Past feedback elicited a feedback-related negativity (FRN). Neural detection of altered feedback accompanied musicians' compensatory timing; anticipatory planning further modulated sensory evaluation during music performance.

(219)

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University of Waterloo

Multiline Slots: Gambling Persistence, Erroneous Cognitions, and Problem

Gambling.

Multiline slots have seen a marked increase in availability; which is disconcerting, as slots have long been known to be one of the most addictive forms of gambling. Interestingly, few empirical studies have explored the relationship between gambling behaviours, erroneous cognitions, and problem gambling status. We recruited 126 players from the general community, and using extinction paradigms, found that (voluntary) persistence to gamble on a slot machine despite financial loss, in addition to scores on the Gambling Related Cognitions Scale (Raylu and Oei, 2004), could account for approximately 40% of the variance in players' problem gambling severity scores.

(**220**)

Thomas Murphy (thomas.murphy@unb.ca), Daniel Voyer
University of New Brunswick

Accident proneness, laterality, and time estimation.

Cerebral laterality has been linked to accident proneness and time perception, but the possible role of time estimation abilities has received little attention. Accordingly, the present study focused on this under-explored question. Participants completed measures of laterality, objective and subjective measures of time perception, and questions related to the number of accidents they have had. Results indicated that left-handedness and low absolute auditory laterality scores were linked with more accidents. Furthermore, the number of accidents was negatively related to the constant error and the precision of time estimation. Possible explanations for these findings and future directions for research are discussed.

(**221**)

William Sauvé (sauve.w91@gmail.com), Robert Davis Moore, Dave Ellemberg
Université de Montréal

Persistent Psycho-affective Outcomes of Concussions in Male Athlete.

This study evaluated the long-term psycho-affective outcomes of concussions in collegiate athletes. Seventy-seven male athletes (43 concussed, 34 controls) completed the Beck's Depression Inventory-II (BDI-II) and the Profile of Mood States (POMS). Analyses revealed that, relative to non-concussed athletes, asymptomatic athletes with history of concussion (1+ year post-injury) reported higher scores on the BDI-II (p(0.05) and on the anger and total mood disturbance subscales of the POMS (ps(0.05). Correlations did not reveal a relation between number of concussions and scores on either the BDI-II or POMS. Thus, a single concussion may be sufficient to cause subtle, yet persistent, psycho-affective changes.

(**222**)

Jonathan Ngoc Tran (jtran096@uottawa.ca), Christine L Sheppard, Shanna Kousaie, Vanessa Taler
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Effects of bilingualism and age on verbal fluency performance in English monolinguals and French-English bilinguals.

We sought to explore how the presence of the bilingual advantage in healthy young and older English monolinguals and French-English bilinguals affects performance on verbal fluency tasks requiring varying levels of executive function. Participants completed four verbal fluency tasks: letter fluency, switching letter fluency, category fluency, and switching category fluency. Monolinguals performed as well as or better than bilinguals on all fluency tasks. These data indicate that monolinguals show superior performance on all tasks of verbal fluency regardless of the level of cognitive control required, raising questions about the robustness and pervasiveness of the bilingual advantage in executive function.

(**223**)

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Université de Montréal

Sensitivity of the CogState Test Battery for Detecting Persistent Concussion-

Related Cognitive Deficits.

The current study evaluated the sensitivity of the CogState battery to detect persistent concussion-related deficits in collegiate athletes (48 history of concussion; 27 controls). The standard testing battery was modified by adding a 2-back condition to the N-back task. We also computed standard scientific variables to compare with CogState clinical output variables. Although clinical variables failed to reveal group difference, scientific variables revealed group differences in accuracy and number of errors on the 1- and 2-back conditions. These results indicate that persistent deficits in executive control would have gone unobserved in the absence of battery modifications and scientific analysis.

(**224**)

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Cognitive Training in Healthy Older Adults.

Recent attention has focused on the benefits of cognitive training in healthy adults. Many commercial cognitive training programs are available given the attraction of both bettering one's cognitive capacity, but also potentially preventing age-related declines. We have thus far studied 15 older adults, above the age of 65. Healthy older adults completed either an 8-week web-based cognitive training program on working memory or logic and planning. An additional control group completed two assessments 8 weeks apart as a measure of test-retest effects. Participants were assessed on broad measures of cognitive abilities, including working memory, executive functioning, processing speed, planning and fluid intelligence. Given the small sample size, we combined across the two training groups and assessed for pre-post training differences on our cognitive tasks. Preliminary data analysis demonstrated no significant differences between groups; however, generally better post-training scores. As data collection continues, we plan to compare the three groups on their performance on cognitive tasks to investigate whether any cognitive training regimen is superior to test-retest effects. Given the commercial availability of cognitive training protocols it is important to assess whether and for whom such programs are useful

(**225**)

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EEG correlates of persistent alterations in mood and affect in athletes with a history of concussion.

Resting electro-encephalograms (EEG) and measures of mood and affect were collected in collegiate male athletes (45 concussion history; 36 controls). Although athletes with a concussion history were 9+ months from injury and "free of concussion symptoms", they exhibited alterations in frontal-alpha power and asymmetry and frontal-beta asymmetry. Athletes with a concussion history also exhibited alterations in frontal-delta power. Frontal alterations in alpha and beta asymmetry were correlated to self-reported depression/anxiety, and anger/mood, respectively. Thus, the current findings provide neurophysiological evidence to corroborate findings of persistent changes in mood and affect following concussion.

(**226**)

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Université de Montréal

Persistent neurophysiological alterations in soccer players with and without a history of concussion.

Event-related brain potentials (ERPs) evoked during a visual discrimination task were recorded in concussed (n=14), non-concussed soccer players (n=16) and in non-contact athletes without a history of concussion (n=19). All athletes were asymptomatic at time of testing and those with a concussion history were 11 + months from injury (40.3 ± 15.3). Relative to controls, concussed athletes exhibited lower P3

amplitude (p(.05), with amplitude decreasing systematically with the number of prior injuries. Further, non-concussed soccer players exhibited a trend towards decreased P3 amplitude relative to controls (p = .09), suggesting that repetitive sub-concussive impacts may also alter neurophysiological function.

(**227**)

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Human Action Perception: The Effects of Goals and Inversion.

While previous research has found that configural information in human action is orientation-dependent, we wondered how goal inference relates to this phenomenon. We investigated change detection for normal actions (dropping an object), miming actions (dropping movements without objects), and control animations (movements yoked to the normal action), in upright and inverted orientations. Results indicated that attention to configural information varied depending on the strength of the goal information (normal)miming=animation), and configural inversion effects were only found for human actions. These results indicate that attention to configural action information may always be orientation-dependent, but is modulated depending on the goal context.

(**228**)

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University of Waterloo

Exploring affective responses to environments: The effects of visual spatial frequencies.

Research has shown that exposure to natural environments can reduce people's stress while improving their attention and emotional state. In contrast, urban environments have been shown to increase individuals' stress, deplete their attention, and deteriorate their emotional state. To build on these findings, we demonstrate that the positive and negative emotions which have been previously associated with exposure to these types of environments are significantly influenced by the power of a limited range of visual spatial frequencies (VSF). We further demonstrate that effects of VSF on emotional state are content agnostic by also replicating the effects using abstract visual patterns.

(**229**)

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Laurentian University

Analysis of eye-movements in the judgment of the authenticity of smiles in schizophrenia.

Research has shown that individuals with schizophrenia have impairments in emotional facial recognition that can be associated with aberrant visual scanning. The goal of the current study was to examine the ability and perceptual-attentional mechanisms in distinguishing enjoyment and non-enjoyment smiles in schizophrenia. Individuals with schizophrenia were less accurate than controls in judging non-Duchenne smiles as non-enjoyment smiles. This difficulty could be explained by a bias towards the mouth. Like their healthy counterparts, individuals with schizophrenia showed difficulty with the judgement of asymmetric smiles. Perceptual processing remains a possible explanation for the difficulty for individuals with schizophrenia, but not controls.

(**230**)

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Sensitivity to horizontal structure and face identification in developmental prosopagnosia and healthy aging.

Sensitivity to horizontal structure in faces predicts identification performance in young, healthy observers (Pachai, Sekuler & Bennett,

2013). Here, we demonstrate an analogous relationship in developmental prosopagnosic (DP) subjects and older observers ()70 years), plus younger and DP-matched controls. Both older and DP observers performed significantly worse than controls, their performance was reduced further when image matching was rendered impossible, and this additional decrement corresponded with decreased horizontal sensitivity, relative to vertical. These results extend the body of evidence relating selective horizontal processing to human face identification, and may have implications for alleviating the identification deficits experienced by many populations

. (**231**)

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When the going gets tough the beautiful get going: Aesthetic appeal facilitates task performance.

The current studies examined the effect of aesthetic appeal on performance. According to one hypothesis, appeal would lead to overall decrements or enhancements in performance. Alternatively, appeal might influence performance only in problem situations, such as when the task is difficult. The two hypotheses were examined in the context of an icon search-and-localization task. Icons were used because they were well-defined stimuli and pervasive to modern everyday life. When search was made difficult using complex, abstract or unfamiliar stimuli, appealing icons were found faster than their unappealing counterparts. These findings show that in a low-level visual processing task, with demand characteristics related to appeal eliminated, appeal can influence performance, especially under duress.

(**232**)

Vincent Laflamme (vincent.laflamme.1@ulaval.ca)
Université Laval

When does four become shorter than eight? Numerical magnitude effects on the perceived duration of empty intervals.

The aim of the present study was to investigate at what stage of processing numerical and temporal perception start to influence each other. In a first experiment where participants had to categorize empty intervals marked by digits, results show that neither the first nor the second presented digit had any effect on temporal estimates. In a second experiment using both filled and empty intervals, results showed that intervals associated with the digit 4 were underestimated compared to those associated with 0 or 8. The possibility that numerical stimuli only influence time perception through their physical magnitude is discussed

. (**233**)

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Vulnerability versus virility: The facial cues, and sensitivity to the cues, that influence economic bargaining.

The facial width-to-height ratio (fWHR) predicts antisocial behaviour in men as well as snap judgements of the same behaviours in men's faces, suggesting it may function as an honest signal of threat. Here, we extend this research and show that the fWHR also influences economic bargaining in a modified Ultimatum Game. Specifically, participants offered more money to, and expected lower offers from, men with larger face ratios. Further, this sensitivity to the fWHR was enhanced among male participants who were weaker and had lower social skills, suggesting that those vulnerable to exploitation may have a heightened sensitivity to this metric.

(**234**)

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Ryerson University[1], *University of Sussex*[2]

The dynamics of audio-visual integration capacity as determined by temporal unpredictability, proactive interference, and SOA.

Over 4 experiments, we challenge the idea that the capacity of audio-visual integration need be fixed at 1 item (Van der Burg et al., 2013). We find that the capacity of audio-visual integration is most likely to exceed 1 when stimulus change operates at a slow rather than fast presentation rate and when the task is of intermediate difficulty (i.e. low proactive interference, low temporal predictability or high proactive interference, high temporal predictability). The data are consistent with the dynamism usually associated with cross-modal binding, with certain conditions allowing association of more than one visual stimulus with one auditory stimulus.

(**235**)

Syaheed Jabar (s2jabar@uwaterloo.ca), Britt Anderson
University of Waterloo

Influence of Spatial versus Orientation Probability on Perceptual Estimations.

Compared to their infrequent counterparts, brief presentations of gratings with frequently-occurring orientations cause participants to more precisely reproduce the stimuli, also resulting in more kurtotic distributions of estimation errors. These distributions and their probability-related differences are best characterized as two Gaussians, differing in variance, being mixed with different proportions. In contrast, the same gratings occurring in frequently-occurring locations do not benefit from improved precision. Because neurons across V1 layers differ in their tuning to orientations, but not necessarily in their spatial receptive fields, acquired probability information could be re-weighting across V1 layers to result in precision improvement specific to orientation.

(**236**)

Christie Rose Marie Haskell (crmhaske@uwaterloo.ca), Britt Anderson
University of Waterloo

Differential effects of performance-based rewards on the allocation of spatial attention.

Unlike uninformative cues, informative cues change the shape of error distributions on orientation judgement tasks. As rewards are also informative, they might have similar effects on performance. Participants made orientation judgements of targets pre-cued with an uninformative, exogenous spatial cue, and received points that were coarsely or finely related to their performance. There was no effect of cueing on the shape of the error distribution in the coarse condition, but it was more peaked on valid trials in the fine condition. These results provide evidence that reward effects are more than binary and that they interact with attention.

(**237**)

Emilie Gontier (emilie.gontier@cirris.ulaval.ca), Giovanna Mioni, Vincent Laflamme, Guillaume Plante, Simon Grondin
Université Laval

Expecting the view of a negative picture disrupts time perception.

The aim of this study was to determine if expecting pictures generating different emotions would influence the temporal perception of a neutral stimulus. A temporal bisection task was used in which the presentation duration of a square (lasting 600 to 1400ms) had to be estimated. Before each trial, a warning image indicated whether the square would be followed by a neutral, positive or negative picture. Results showed that the expectation of negative compared to positive or neutral images induced temporal overestimation. These results suggest that expecting a negative emotion could speed-up the internal clock by increasing the arousal level.

(**238**)

Kelyn Jeanette Montano [1] (montak@mcmaster.ca), Cara Tigue [1], Sari Isenstein [1], Pat Barclay [2], David Russell Feinberg[1]
McMaster Univesity[1], *University of Guelph*[2]

The Effect of Voice Pitch on Trusting Behavior.

Women tend to trust men with low-pitched voices as political leaders, but trust men with

high-pitched voices in mating scenarios. To elucidate the role of pitch in perceptions of trust, we used a one-decision variant of The Trust Game in which female participants were given the choice to trust the male to divide the money, or to end the game, taking a smaller than equal sum. Male receivers were simulated using pitch-manipulated voice recordings. Women trusted raised pitch voices more than lowered pitch voices. These results suggest men with relatively higher pitched voices are perceived to be more trustworthy.

(239*)

Simona Manescu (simona.manescu@umontreal.ca), Benjhyna Daniel, Renée-Pier Filiou, Franco Lepore, Johannes Frasnelli
Université de Montréal

Handedness determines nostril dominance in trigeminal perception.

The aim of the present research is to further explore the right nostril advantage phenomenon found in trigeminal perception in right and left-handed individuals. We evaluated 50 right-handed and 14 left-handed participants on two iso-intense stimuli; cinnamaldehyde (CA) and eucalyptol (EU). Right-handed participants rated the percept to be significantly more as EU when EU was presented to the right nostril and CA to the left nostril. For the left-handed participants, we find a tendency in the exact opposite direction suggesting that handedness dictates which nostril will be advantageous in trigeminal perception.

(240)

Daryl Atkinson (datkinson@mta.ca), Geneviève Desmarais
Mount Allison Univeristy

The Effects of Experience, Semantic Congruency, and Spatial Congruency on Multisensory Integration.

We examined the effects of spatial congruence, semantic congruence, and musical experience on multisensory integration. We asked undergraduate participants to either identify the modality (EXP 1) or to localize (EXP 2) auditory, visual, bimodal stimuli representing pets and musical instruments. Crucially, we varied the semantic and spatial congruence of bimodal stimuli. Responding to congruent bimodal information resulted in interference compared to responding to unimodal information when asked to identify the modality, but in facilitation when asked to locate stimuli. The impact of semantic congruence, spatial congruence, and musical experience were task-dependent and could produce facilitation or interference.

(241)

Guillaume Plante (Guillaume.P26@gmail.com), Pier-Luc Gamache, Simon Grondin
Université Laval

About the modality effect on time reproduction.

The aim of this study was to assess the impact of the sensory modality of the signal marking the target interval in a time reproduction task. Eight participants reproduced time intervals (1000ms and 5000ms) marked by either an auditory or visual stimulus or by both simultaneously. Results showed that the participant overestimate the short duration but underestimate the long. Moreover, no reduction of the coefficient of variation was observed when the signals from both modalities are presented simultaneously. These results are not consistent with the Multi-Timer Model where the duration estimated by each modality should be averaged for reducing variability.

(242)

Charles Collin (Charles.Collin@uottawa.ca), Andrea Trebilcock, Laura Ziebell, Heather Woods-Fry
University of Ottawa

IAMFaRR: Individual Assessment of Maximum Facial Recognition Range.

Face recognition is a vital perceptual/cognitive capacity, yet there exists no established clinical tool to assess its perceptual aspects. We present the IAMFaRR test, which estimates the longest

distance at which an individual can recognize a face. This is done via a staircase procedure measuring the threshold stimulus size at which an individual can reliably complete an 8AFC match-to-sample task with standardized face images. Results show a strong relationship between threshold face size and letter acuity, but no relationship with one's cognitive capacity to recall faces. This validates the IAMFaRR as a test of the perceptual aspects of face recognition.

(**243**)

Brendan M. Stanley (stanley@mcmaster.ca), Zachary James Livshin, Matthew V Pachai, David I Shore
McMaster University

Can increasing eye fixations improve face recognition in males?

Females remember faces better than males (Herlitz & Rehnman, 2008) and make more fixations during initial encounters with a new face (Heisz, Pottruff, & Shore, 2013). Additionally, the number of fixations made during encoding was correlated with face recognition performance. We hypothesized that instructing males to increase number of fixations made during encoding would ameliorate the sex difference. We replicated the correlation between recognition performance and number of fixations in females, found that males given instructions made significantly more fixations than controls, however, a significant correlation between recognition discrimination and number of fixations in males was not found. Implications and limitations of this result will be discussed.

(**244**)

Mark Cole (mcole@uwo.ca), Sachia Grogan
Huron University College

The Matrix: Does the presence of a visual pattern facilitate the learning of a spatial pattern in rats?

Sixteen food towers were arranged in a 4 x 4 matrix with 4 towers, always in a randomly-selected 2 x 2 pattern, baited. Rats foraged over 50 trials. For visual-pattern rats, 4 of the towers, arranged in a different randomly selected 2 X 2 pattern were striped, the remaining 12 being plain white. For visual-random rats, the 4 striped towers were placed in random locations. Never more than one striped tower was also baited. Visual-pattern rats required significantly fewer choices to find the 4th baited tower than did visual-random rats during the last 20 trials.

Symposium Session 1

Saturday, June 6th (1:00 – 2:00 p.m)
Carleton University

Symposium: Embodied Cognition

University Centre 180

1:00 – 2:00 p.m.

(**250**)

Penny M. Pexman [1] (pexman@ucalgary.ca), David Sidhu [1], Paul Siakaluk [2]
University of Calgary[1], *University of British Columbia*[2]

Embodiment of Verb Meaning

Research examining semantic richness effects has shown that noun meaning is multidimensional. We extended the semantic richness approach to verb stimuli to investigate a particular dimension of verb meaning–embodiment. We characterized a dimension of relative embodiment and collected ratings for 687 English verbs. We tested the effects of relative embodiment on verb processing in lexical decision, action picture naming, syntactic classification, and recognition memory. All experiments showed facilitatory effects of relative embodiment, even after several other lexical and semantic variables were controlled. The results suggest that relative embodiment is an important aspect of verb meaning.

(**251***)

Corson Areshenkoff (areshenk@uvic.ca), Daniel N. Bub, Michael E.J. Masson
University of Victoria

Embodied Representation of Word Meaning

Embodied accounts hold that language comprehension is grounded in sensory-motor representation. In support of this view, research has found rapid motor priming effects for words like "hawk" or "shoe", which differ as to whether they are typically associated with an up or down direction. We show that words connoting an up/down direction perturb left/right movements of a computer mouse, but that such effects are contingent on including up and down movements in the response set. Without such movements, no directional effects are obtained. This finding calls into question the proposal that word meaning is grounded in spatial aspects of experience.

(**252**)

Grayden Solman [1] (gsolman@gmail.com), Tom Foulsham [2], Alan Kingstone [1]
University of British Columbia[1], *University of Essex*[2]

The Principles of Attentional Selection are Profoundly Different for the Head and Eyes

Using head- or eye-contingent displays, and masking parts of the peripheral visual field, we manipulated the features available through orienting movements. We reveal that when the contingent window is asymmetric, with more information preserved either horizontally or vertically, eye-movements tend to follow the information within the window. In sharp contrast, head movements tend to explore unseen regions outside the window. These data demonstrate that eye- and head-movements complement each other during naturalistic coordinated movement, reflecting their different orienting characteristics (e.g., fine vs. coarse control). In short, the principles of attentional selection are embodied.

(**253**)

Evan F. Risko (efrisko@uwaterloo.ca), Tim L. Dunn
University of Waterloo

Cognitive Offloading: Scarcity and the Avoidance of Mental Demand

Individuals often use their body to try to offload cognitive demands (i.e., cognitive offloading). In the present investigation we examined the influence of scarcity of cognitive resources (i.e.,

working memory) on the decision to offload (versus relying on internal processes) in a perceptual task. Results suggest that individuals are more likely to offload in a more resource demanding task even when that offloading (by design) did not differentially benefit performance as a function of task demand. Implications for understanding cognitive offloading and the principles guiding the avoidance of mental demand will be discussed.

•ψ•

Symposium: Probing the link between brain and behavior with optogenetics

University Centre 182
1:00 – 2:00 p.m.

(**254**)
Jonathan Phillip Britt
(jonathan.britt@mcgill.ca)
McGill University

Neural Mechanisms Underlying Behavioral Reinforcement in the Basal Ganglia

Reward-seeking behavior is regulated by glutamatergic and dopaminergic signalling in the nucleus accumbens. A prominent hypothesis is that dopaminergic reinforcement signals influence the processing of glutamate-encoded environmental stimuli in the nucleus accumbens. This talk examines how these different glutamate inputs innervate and engage accumbal neurons. The data challenge the idea that any of these inputs encode motivationally-neutral information, as optogenetic stimulations designed to offset the differential potency of each input show that activation of each afferent pathway can reinforce instrumental behavior. This work characterizes some of the fundamental organizing principles of basal ganglia information processing.

(**255**)
Ivan Trujillo-Pisanty (pisanty.ivan@gmail.com)
Concordia University

Probing the Link Between Brain and Behavior with Optogenetics. Behavioral Dissection of the Role of Dopamine on Reward Seeking in Rats Working for Optical Stimulation of Midbrain Dopamine Neurons

The selectivity and temporal resolution of optogenetics offer promising means for dissecting the psychological, computational and neural mechanisms underlying reward seeking. To this end, we combined optogenetics with psychophysical, mathematical modelling, and pharmacological methods. We demonstrate spatiotemporal integration of dopamine signals at a stage of processing downstream from the circuitry that integrates the directly evoked neural signals subserving the rewarding effect produced by electrical stimulation of the medial forebrain bundle. These findings shed light on the organization of neural circuitry implicated in the processing and procurement of rewards, drug dependence, and other impulse-control disorders.

(**256**)
Robert Bonin (rob.bonin@gmail.com)
Laval University

Exploring Sensory Activity and Plasticity with Spinal Optogenetics

Optogenetics offers a remarkable potential to explore the physiological processes underlying normal and pathological sensory function by enabling the precise temporal control of specific neuronal populations with light. In this talk I will summarize our recent work using optogenetics to study plasticity in pain processing pathways of the spinal cord, and to study gentle touch sensation in mice. Finally, I will describe the development of an epidural optic fiber implant that allows the delivery of light to the spinal cord dorsal horn and dorsal roots of sensory afferents in freely-behaving animals.

(**257**)

Paul R. Albert (palbert@uottawa.ca), Ginette Hupe, Sean Geddes, Jean-Claude Beique
University of Ottawa

Optogenetic Targeting of Serotonin Neurons to Study Anxiety and Depression

Among the most effective antidepressants are the SSRIs, serotonin-specific reuptake inhibitors that block serotonin reuptake, resulting in increased serotonin neurotransmission. In order to probe the region-specific role of serotonin in antidepressant actions, we are developing an in vivo optogenetics approach for light-evoked stimulation of serotonin neurons to monitor the effect on behavior. We will overexpress channelrhodopsin-2 (ChR2, a light-activated cation channel) in serotonergic neurons. By using light to selectively activate serotonin projections in specific brain regions of interest, such as prefrontal cortex, ventral hippocampus, or amygdala, we will address whether activation of these circuits mimics antidepressant actions. Collectively, our data indicate that light can be used to bi-directionally modulate the firing activity of raphe 5-HT neurons. For behavioral studies, mice will be implanted with fiber optics targeted at these regions to test the consequence of light-induced serotonin release. The ability to validate a role for optogenetic stimulation on antidepressant behavior could lead to novel clinical deep brain light stimulation approaches that harness the capacity of optogenetics.

•ψ•

Symposium: Reading Words for Meaning: Semantics and Morphology (Part 1)

River Building 2200
1:00 – 2:00 p.m.

(**258**)

Ashley Danguecan (danguec@uwindsor.ca), Lori Buchanan
University of Windsor

Charting the Flexibility of Semantic Processing Using Concreteness and Semantic Neighbourhood Density

There is emerging evidence that semantic neighbourhood density (SND; Buchanan, Westbury, & Burgess, 2001) may interact with other word properties (e.g., concreteness) to influence word recognition (Danguecan & Buchanan, in preparation). Importantly, these data suggest that the behavioural effects of semantic variables are impacted by task demands (i.e., the degree of explicit semantic processing required). The present study aims to more precisely chart the flexibility of semantic processing by comparing recognition response times of words varying in concreteness and SND across several tasks with different explicit semantic requirements. Such findings contribute to the development of a comprehensive theory of semantic processing.

(**259**)

Ian Newcombe [1] (newcombe@unbc.ca), Paul D. Siakaluk [1], Tamara Kumpan [1], Brian Duffels [1], Penny Pexman [2]
University of Northern British Columbia [1], *University of Calgary* [2]

The Effects of Emotional Experience in Conceptual Processing

Situated conceptualization (Barsalou, 2009) suggests that emotion information exerts more of an influence on abstract than concrete conceptual processing. One measure of situated conceptualization is emotional experience (EE; Newcombe et al., 2012). We examined the effects of EE on abstract and concrete conceptual processing in LDT, SCT, and a task we call semantic lexical decision (SLDT). We observed facilitatory EE effects for abstract words in all three tasks and for concrete words in LDT; and inhibitory EE effects for concrete words in SCT and SLDT. The results suggest that EE is an

important dimension of abstract conceptual processing.

(**260**)

Alain Desrochers
(Alain.Desrochers@uottawa.ca)
University of Ottawa

The Contribution of Semantics and Phonology to Gender and Lexical Decision

The effects of word animacy and phonological structure on visual word recognition were investigated in two experiments. French-speaking participants were shown 400 nouns controlled for length, morphological structure and frequency. Over two sessions they made speeded decisions on the gender class of the stimuli and their lexicality. In the gender decision task responses were more accurate and faster when nouns a) were animate rather than inanimate, b) belonged to the masculine rather than the feminine class, and c) began with consonants rather than vowels. The same results were obtained in the lexical decision task but with a lesser magnitude.

(**261**)

Darcy White (d4white@uwaterloo.ca), Derek Besner
University of Waterloo

Semantic Activation from Print: Strategic Versus Structural Limitations

It is widely believed that semantic processing in the context of visual word recognition is capacity free, and that it occurs regardless of an individual's intention. The current investigation addresses the issue of whether the Stroop effect varies in size as a function of the SOA distribution in the PRP and task set paradigms. Underadditvity of Stroop and decreasing SOA implies capacity free processing, whereas additivity implies a capacity limited process or strategically driven performance optimization.

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Symposium: Models of Cognitive Processing: Implications for Clinical Reasoning and Decision Making in Medicine

River Building 1200
1:00 – 2:00 p.m.

(**262**)

Geoffrey R. Norman (norman@mcmaster.ca)
McMaster University

Models of Cognitive Processing: Implications for Clinical Reasoning and Decision Making in Medicine

Medicine has been an area of interest to cognitive psychologists. Studies range from examination of basic processes of attention and perception using eye tracking and signal detection theory to studies of reasoning and decision-making. While experimental control may be lower than in the cognitive lab, there are several advantages: a) Ecological validity – the materials generally must represent realistic tasks, b) Practical application is self-evident, c), relation to expertise informs the acquisition of the skill. In this symposium we will present examples of research programs that examine a) learning and transfer , b) emotion and learning, c) clinical reasoning.

(**263**)

Kulamakan Kulasegaram
(mahan.kulasegaram@utoronto.ca)
University of Toronto

Classrooms, Clinics, and Cognition: Transfer and Integration of Medical Knowledge

Transfer of learning as a cognitive phenomenon has been under investigation for well over 100 years. However, medical education has struggled with achieving transfer from the classroom to the clinic. Medical problem solving poses unique challenges requiring transfer across several contexts as well as the integration of multiple

knowledge domains. This talk will discuss research on the application and extension of transfer theory in the context of training novice medical students to integrate and apply knowledge. I discuss how transfer theory can be advanced in the complex training environment of medical education and how curriculum is informed by theory.

(**264**)

Sandra D. Monteiro (monteisd@mcmaster.ca)
McMaster University

Models of Cognitive Processing and Diagnostic Reasoning

Pedagogical approaches to improving diagnostic accuracy in medicine are highly influenced by a model of human reasoning based on the central role of cognitive biases. When translated into practical strategies however, this model fails to capture the essence of human cognition. It also fails to stand up to scientific testing, yet its popularity persists. I present evidence demonstrating that a dual process model of human reasoning and cognitive bias cannot account for human performance in ecologically valid contexts, such as medical diagnosis. I then review evidence of more successful pedagogical strategies based on appropriate models of human memory and attention.

(**265**)

Meghan M. McConnell (mcconn@mcmaster.ca)
McMaster University

The role of emotions in clinical reasoning

Emotions have been the subject of considerable theoretical and empirical research within cognitive psychology. A plethora of laboratory-based research has shown that emotions and moods influence a variety of cognitive processes involved in learning, such as attention, memory, and decision-making. Given the ubiquitous nature of emotions in learning environments, an important next step is to examine the extent these findings are observable in more ecologically valid settings. Medical education provides a useful platform to study emotions in real-world education scenarios. Using a cognitive psychology lens, the current talk discusses research examining the roles of emotions in the training, assessment, and development of clinicians.

Symposium Session 2

Saturday, June 6, 2015 (2:15 – 3:15 p.m.)
Carleton University

Symposium: Processes in Numerical Cognition

University Centre 180
2:15 – 3:15 p.m.

(**266**)

Marcie Penner-Wilger (Pennerwilger@gmail.com), Rylan J Waring, Adam T Newton, Cindel White
King's University College at Western University

Calculation: A Digital Domain

Finger gnosis and magnitude comparison were examined as predictors of adult calculation skill. Previous findings were extended by controlling for domain-general comparison processes (using a luminance judgment task) and visuo-spatial memory. Finger gnosis and symbolic magnitude comparison predicted unique variance in adults' calculation skill. The control variables, luminance comparison and visuo-spatial memory, did not account for significant variance in calculation skill, nor did non-symbolic magnitude comparison. These findings suggest that (1) the relation between finger gnosis and calculation does not reflect visuo-spatial memory and (2) the relation between magnitude comparison and calculation reflects number representations, rather than domain general processes.

(**267**)

Thomas Faulkenberry [1] (faulkenberry@tarleton.edu), Alexander Cruise [2], Dmitri Lavro [3], Samuel Shaki [2]
Tarleton State University[1], *Ariel University*[2], *Ben Gurion University of the Negev*[3]

Response Trajectories Support a Late-Interaction Model of the Size-Congruity Effect

The size congruity effect (Henik & Tzelgov, 1982) arises from a comparison task in which two presented stimulus numbers vary on two magnitude dimensions, both numerical and physical. Two competing hypotheses have been proposed to explain the size congruity effect. An early interaction model proposes that a digit's physical and numerical magnitude are first mapped onto an integrated analog representation, and all conflicting information is resolved independently from any motor response execution. A late interaction model states that physical and numerical information are encoded in functionally independent pathways and the observed size congruity effect results from response competition between these pathways. In the present study, we used computer mouse tracking to test these competing models. We found that average mouse trajectories for incongruent trials were reliably curved toward the competing response. Furthermore, large distance pairs exhibited more curvature than small distance pairs. Both of these results indicated that incongruities between numerical and physical size are carried through the response process, lending support to a late interaction model of the size congruity effect.

(**268**)

Rachel Fine (rfine@uchicago.edu), Erin Maloney, Sian Beilock
University of Chicago

Numbers and Cents: The Relationship Between Math Anxiety and Financial Literacy

How are your finances? Don't know? Feeling anxious? Recent research has shown that many people do not have the financial

knowledge they need. While much research has focused on where and how people acquire financial literacy, less work has explored the affective components. In this talk I will present a current study that investigates the relationship between financial literacy and math anxiety.

(**269**)

Aryn Pyke (aryn.pyke@gmail.com), John R. Anderson
Carnegie Mellon University

Comparing Strategies & Discovering Unobservable Mental Stages in Problem Solving using fMRI.

The way problems are mentally represented and solved can reveal individual differences and affect learners' ability to later extend and transfer their knowledge to new, slightly different problems. Self reports have known limitations for understanding processing differences. We explored the use of brain imaging (fMRI) data to discover distinct mental stages during solving. Students were taught to solve a new class of problems with either rote formulas or a more semantically interpretable algorithm. Both required basic arithmetic computations, but the latter afforded superior transfer. Analyses of the fMRI data (using HMM/MVPA, Anderson & Fincham, 2014) were conducted for each strategy to discover the number and duration of distinct mental stages (brain activation signatures). Comparing these characterizations of the solution stages for each strategy allowed us to identify the stages where they converged and diverged, and may further provide information about the brain signatures associated with rote versus deeper understanding.

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Symposium: Mechanisms of selective-attention in the normal and concussed brain : evidence from human electrophysiology

University Centre 182
2:15 – 3:15 p.m.

(**270**)

Talia Losier (talia.losier@gmail.com)
Université de Montréal

Encoding, Attention, and Masking in the Attentional Blink.

The attentional blink (AB) is a difficulty in reporting a target presented at a short delay after an earlier one in a rapid sequence. In this electrophysiological study, costs of encoding were manipulated by displaying two or three targets. Although the P3 was delayed more for a larger encoding load at short lag, the N2pc, which reflects deployment of attention, was unaffected. This result might be a consequence of not masking the last target, and suggests the mask could play an important role in the AB by hindering attentional engagement on a target, which was tested in a new experiment.

(**271**)

Brandi Lee Drisdelle (brandi.drisdelle@gmail.com), Gregory West, Pierre Jolicoeur
Université de Montréal

A more efficient deployment of attention predicts faster reaction times: Evidence from the N2pc.

Our objective was to relate the efficiency of attentional deployment on downstream processing of an attended target. The N2pc, an electrophysiological component characterised by a larger negative deflection contralateral to the visual field where a target is presented, is observed when attention must

be deployed to the target to perform the task. If target processing is facilitated by a more efficient attentional deployment, reaction times should be shorter. Results confirmed this prediction: A larger N2pc (reflected by a more energetic deployment of attention) predicted shorter reaction times, suggesting a direct link between attention and behaviour.

(**272**)

Claude Alain (calain@research.baycrest.org)
University of Toronto

Orienting Attention to Sound Object Representation in Short-Term Memory

The object-based theory of auditory attention postulates that we can orient our attention to one of several sound object representations in short-term memory (STM) through top-down reflective processing. We tested this assumption using a variant of the delayed match-to-sample task in which a cue appears during the retention interval (i.e., retro-cue). Participants were more accurate and/or faster when the retro-cue was informative. Meaningful retro-cues generated a sustained evoked response over fronto-central scalp regions, as well as changes in alpha/beta oscillations. The implications of these findings for current theories of how concurrent sounds are represented and attended in STM are discussed.

(**273**)

Louis De Beaumont [1] (louis.de.beaumont@umontreal.ca), Pierre Jolicoeur [2]
Université of Quebec at Trois-Rivieres[1], *Université de Montréal*[2]

Désynchronisation alpha pour une tâche attentionnelle chez des sujets commotionnés

Event-related potentials (ERPs) have been useful to detect persistent subclinical alterations of cognitive processes in concussed athletes. Studies interested in ERP markers of attention revealed significant N1, P2 and P3 amplitude alterations in asymptomatic athletes. Pertinently, concussion effects on these ERP markers of attention and working memory were found to be exacerbated with recurrent concussions. Here, we studied the long-term and cumulative effects of concussion on alpha-frequency Event-related desynchronization (ERD) when performing a visual-spatial attention task. Alpha rhythm ERD reduction was found to be related to the number of concussions sustained and correlated significantly with P3 amplitude reductions.

•ψ•

Symposium: Reading Words for Meaning: Semantics and Morphology (Part 2)

River Building 2200

2:15 – 3:15 p.m.

(**274**)

Penny M. Pexman [1] (pexman@ucalgary.ca), Alex Taikh [2], Ian Hargreaves [1], Melvin Yap [3]
University of Calgary[1], *Western University*[2], *National University Singapore*[3]

Semantic Richness Effects in Word and Picture Classification

In general, processing is facilitated for words that are associated with more semantic information. These so-called semantic richness effects have been a useful way of investigating semantic processing, but each effect has tended to be examined in isolation. Here we conducted a multidimensional examination of semantic richness effects and extended the approach to picture processing in order to contrast effects across modalities. We found multiple semantic richness effects in both word and picture tasks, but also found that different semantic dimensions influenced processing in each task. The results are

consistent with the view that semantic processing is context-sensitive and multidimensional.

(**275**)

Jeff Keith (jkeith1@ualberta.ca), Chris Westbury
University of Alberta

Performance Impact of Morphological Decomposition and Stop-lists on Corpus-based Semantic Space Models

Although debate about the extent of morphological decomposition during lexical access continues, much evidence suggests that multi-morphemic words undergo morphological decomposition when they are accessed. One potential reason for decomposition is that it may simplify the computation of lexical semantics. Corpus-based semantic space models, which primarily rely upon lexical co-occurrence statistics for computing semantics, provide a method for exploring this possibility. Little work has been done to explore the effect of employing morphological decomposition on inflected forms of words in corpora prior to compiling co-occurrence statistics. This study explored the impact of that decomposition (as well as the effect of including or excluding close class words) on the performance of corpus-based semantic space models on a series of semantic and behavioural prediction tasks. We found that morphological decomposition significantly improves the performance of a co-occurrence semantic space model. An overall decrease in performance was observed in models employing stop-lists (e.g., excluding closed class words).

(**276**)

Stephen J. Lupker (lupker@uwo.ca)
University of Western Ontario

Morphological Priming in the Sandwich Priming Paradigm

A common claim in the literature is that morphologically complex words undergo mandatory decomposition early in processing as evidenced by the report that masked priming from pseudo-multimorphemic primes (corner-CORN) is nearly as large as from true multimorphemic primes (walker-WALK). These effects are, however, fairly small, potentially obscuring true differences (as demonstrated in the present Experiment 1). To increase effect sizes, we used two versions of Lupker and Davis's (2009) sandwich priming technique, the standard version, where the initial prime is the target (corn-corner-CORN) and one where the initial prime is the suffix (er-corner-CORN). Both manipulations increased priming for walker-WALK pairs but not for either corner-CORN pairs or form pairs (i.e., brothel-BROTH).

(**277**)

Debra Jared (djjared@uwo.ca), Olessia Jouravlev
University of Western Ontario

Semantic Effects in Morphological Processing

Our research investigated how skilled readers process morphologically complex words. Specifically we examined whether morphologically complex words undergo an early and automatic suffix stripping process, and when in processing semantic effects arise, using both behavioural and ERP measures. Furthermore, we sought to understand whether findings depend on whether words are primed or not. Implications for theories of morphological processing will be discussed.

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Symposium: Aviation Psychology

River Building 1200
2:15 – 3:15 p.m.

(**278**)

Robert Allison [1] (allison@cse.yorku.ca), Sion Jennings [2], Greg Craig [2]
York University [1], *National Research Council of Canada* [2]

Visual Perception and Performance during NVG-aided Civilian Helicopter Flight

Civilian operations are an important and growing application of night vision goggles (NVGs). Such devices extend human sensory capabilities but also introduce perceptual artefacts. In a series of laboratory experiments and helicopter-based flight trials we analyzed subject performance on model tasks based on typical civilian aviation applications. In the context of security and search operations the tasks included directed search over open and forested terrain, detection and identification of a temporary landing zone and search/tracking of a moving vehicle marked with a covert IR marker. Two other sets of flight trials explored the potential of night-vision aids in aerial wildfire detection; one was a controlled experiment and the other part of operational aerial detection patrols. The results of these studies confirm that NVGs can provide significant operational value but also illustrate the limitations of the technology and the ability of human operators to compensate for perceptual distortions.

(**279**)

Kathleen Van Benthem (kathy_vanbenthem@carleton.ca)
Carleton University

Predictors of Pilot Prospective Memory: the Relative Effects of Domain-General and Domain-Specific Cognitive Processes

Prospective memory has been identified as a cognitive construct strongly associated with aviation outcomes. Thus, determining predictors of prospective memory failures should promote a better understanding of pilots at risk for a mishap or critical incident. In this study, a structural equation model was generated with the purpose of identifying the effects of individual differences, and domain-specific and domain-general cognition on prospective memory during simulated flight. The utility of prospective memory in predicting incidents during flight was also examined. Results challenge current practices of employing domain-general cognition to predict aviation outcomes or domain-specific cognitive processes, such as prospective memory.

(**280**)

Shannon O'Malley [1] (omalley@mcmaster.ca), Amentha Rajagobal [1], Joey Legere [1], John G Grundy [2], Martin von Mohrenschildt [1], Judith M. Shedden [1]
McMaster University [1], *York University* [2]

Isolating the Contribution of Disturbance Cues from Physical Motion on Training in a Motion Simulator

We examine the benefit of motion during flight simulation by isolating different types of motion: physical motion correlated with pilot steering, and environmental disturbance motion. Participants performed a three-dimensional navigation task in one of five training conditions that varied in the presence of disturbance and physical motion; at test

both types of motion were present. When training conditions were grouped by presence of disturbance motion, we observed significant differences at test on joystick control strategies; no differences were seen when training conditions were grouped by presence of physical motion. Results highlight the importance of type of motion used during training.

(**281**)

Jocelyn M. Keillor (Jocelyn.Keillor@nrc-cnrc.gc.ca), Gregory L. Craig, Heather E. Wright -Beatty, Marc D. Alexander, Nicholas Berezny, Viresh Wickramasinghe
National Research Council Canada

Helicopter Pilot Heart Rate Variability in Relation to Differences in Rotor Tuning and Seat Cushion Impedance

Exposure to whole-body vibration (WBV) has been related to stress, cognitive fatigue and a number of adverse health effects. However, the mechanisms for these effects are not clearly understood. Indeed "health effects" identified in the WBV standards (e.g. ISO-2631) are weighted by frequency according to sensory magnitude rather than any measured physiological effects. NRC carried out a series of flights in which we manipulated the vibration profile of a Bell 412 helicopter was varied by altering the tuning of the main rotor, and observed differences in Heart Rate and Heart Rate Variability (HRV). We also manipulated the impedance properties of the seat cushion, and observed comparable relationships between vibration and HRV. HRV may prove to be a useful means of indexing the physiological effects of WBV exposure.

Symposium Session 3

Saturday, June 6, 2015 (3:30 – 4:30 p.m.)
Carleton University

Symposium: Predictors of Children's Early Mathematical Development

University Centre 180
3:30 – 4:30 p.m.

(**282**)

Adam Taylor Newton [1] (adam3newton@gmail.com), Marcie Penner-Wilger [2]
Western University[1], *King's University College at Western University*[2]

The Cognitive and Mathematical Profiles of Children in Early Elementary School

This study investigated cognitive profiles of children in early elementary school. Unlike other learning difficulties, mathematics impairments are not characterized by a singular deficit, instead multiple general and numeracy-specific cognitive skills are proposed to underlie mathematics ability. Participants were 97 children tracked from SK to grade two. Using numeracy, WM, receptive language, and phonological awareness, a two-step cluster analysis revealed a three-cluster solution. Groups were characterized as (1) above average, (2) average with weak visuospatial working memory, (3) poor with strong visuospatial working memory. Cluster 1 demonstrated strengths in mathematics and reading, compared to clusters 2 and 3.

(**283**)

Swiya Nath (swiyan@gmail.com)
University of Cambridge

Cognitive Abilities Underlying Mathematics Development, and the role of Construction Play

Research on working memory and mathematics has been controversial. We found that while verbal memory was correlated to mathematics performance in 9-year-old children, visuospatial memory was the significant predictor of mathematics performance in 7-and 9-year-old children, as well as adults, even when executive functions were controlled. The talk then transitions to the applied outcome of the relationship between construction play and mathematics performance mediated by visuospatial memory, independent of spatial reasoning ability. In conclusion, we suggest visuospatial memory as an underlying mechanism of mathematics development, and construction play as a possible intervention tool to facilitate visuospatial memory and mathematics performance.

(**284**)

Jill Alexandra Beatrice Price (jillabprice@gmail.com)
University of Regina

Children's Mathematics Anxiety and its Effect of their Conceptual Understanding of Arithmetic and Arithmetic Fluency

The current study investigated how children's mathematics anxiety impacted their conceptual understanding and application of arithmetic on a problem-solving task and their arithmetic fluency on a timed mathematics task. It also investigated how grade and sex impacted children's mathematics anxiety. As an exploratory component, it uniquely studied how teachers' mathematics anxiety impacted their students' mathematics anxiety, their students' conceptual understanding of arithmetic on the problem-solving task, and their arithmetic fluency on the timed mathematics task. Results showed that children with higher mathematics anxiety had weaker conceptual understanding of arithmetic on the problem-solving task and

weaker arithmetic fluency on the timed mathematics task compared to children with lower mathematics anxiety. It also showed that females had higher mathematics anxiety compared to males. However, there was no significant effect of grade on children's mathematics anxiety. The exploratory component showed that teachers with higher mathematics anxiety had students with weaker conceptual understanding of arithmetic on the problem-solving task but the same arithmetic fluency on the timed mathematics task compared to teachers with lower mathematics anxiety. There was also no significant effect of teachers' mathematics anxiety on their students' mathematics anxiety.

(**285**)

Erin Anne Maloney (erinmaloney@uchicago.edu), Elizabeth Gunderson, Gerardo Ramirez, Susan Levine, Sian Beilock
University of Chicago

Teachers' Stereotype Endorsement Hinders Girls' Math Achievement and Increases their Math Anxiety

Elementary-level teachers often hold negative stereotypes about mathematics which may adversely impact their students. Here, with a sample of 669 children in 1st and 2nd grade and 76 of their teachers, we demonstrate that when teachers endorse the stereotype that boys are better at math, their female students lean less math and become more math anxious by school-years' end. These data are discussed with respect to a model of the development of math anxiety.

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Symposium: Perception of Self-Motion

University Centre 182
3:30 – 4:30 p.m.

(**286**)

Shannon O'Malley (omalley@mcmaster.ca), Ben Townsend, Martin von Mohrenschildt, Judith M. Shedden
McMaster University

The Integration of Physical Acceleration Cues with Visual Acceleration Cues

It is standard practice in flight simulation to present motion stimuli slightly before visual stimuli, despite the fact that in the real world information will be presented in sync. To examine if changes in the relative timing of stimuli can affect behaviour, we report a series of studies in which the relative timing of physical acceleration cues and visual acceleration cues are varied. We are interested in which relative timing of stimuli (in sync, motion slightly before or vision slightly before) results in optimal integration and how much the relative timing can shift by before changes in behaviour are seen.

(**287**)

Michael Barnett-Cowan (mbc@uwaterloo.ca)
University of Waterloo

Time Flies When You're Not Standing Still

It is relatively unknown how conscious awareness of sensory processing changes during self-motion. Common anecdotal reports of falling, for example, suggest that people often report distortions in their perception of time with little to no recollection of what occurred during the fall. Our work has previously shown that the perceived onset of self-motion is slow compared to the other external sensory events. Here I will review recent studies focused on the perceiving timing of fall onset that further suggest perceptual delays of self-motion may reflect the central nervous system prioritizing physiological response to self-motion over perceptual awareness.

(**288**)

Hong-jin Sun (sunhong@mcmaster.ca)
McMaster University

Perception of Travelled Distance during Self-motion

A moving organism typically receives multiple sources of sensory information, including dynamic visual cues such as optic flow and body-based information provided by proprioceptive, efference copy and vestibular cues. To assess the separate role of each sensory cue, and understand how these cues interact and are integrated to form a single percept, we studied how humans process the extent of their self-motion by using several novel experimental paradigms to manipulate cue availability and create cue-conflict scenarios in both real and virtual environments. We demonstrated that humans tend to weigh body-based information more heavily than optic flow when estimating distance walked.

(**289**)

Laurence Harris (harris@yorku.ca), Meaghan McManus
York University

Self-Motion Evoked from the Far Periphery

Early studies suggested that peripheral vision was more effective than central vision in evoking self-motion. Controlling for retinal area suggested all regions were equally effective. Using a large-field Edgeless Graphics display (FOV ±112°) and blocking central or peripheral regions, we extended these studies into the far periphery. Participants indicated when they reached the position of previously presented targets. Gain (perceived/actual distance) and spatial decay were obtained using Lappe et al. 's leaky spatial integrator model (EBR 2007, 180:135). Optic flow in the far periphery evoked higher gains than full-field or central motion suggesting inhibitory interaction between retinal regions.

•ψ•

Symposium: Language Comprehension and Representation

River Building 2200
3:30 – 4:30 p.m.

(**290**)

Ragav Kumar (ragavk@uvic.ca), Michael E.J. Masson, Daniel N. Bub
University of Victoria

Action Representations Evoked by Object Names

We examined the mental representations of hand actions evoked by names of handled objects. When cued to make actions with the left or right hand with no object name present, subjects showed no hand dominance effect. When primed with object names, subjects were faster when responding with their dominant hand and when the hand action was congruent with the typical orientation of the prime object's handle (e.g., a vertical wrist orientation for a teapot). These results suggest that viewing an object name when formulating an independent action intention evokes a particular action representation required to manipulate that object.

(**291**)

Murray Singer (m_singer@umanitoba.ca), Kevin G. Solar, Jackie Spear
University of Manitoba

Validating Given Versus New Discourse Information

Readers closely monitor discourse congruence. For example, they are attentive to subtle relations between (a) the target, The cop believed/knew that the vehicle with the flat was a truck, and (b) its antecedent, Dan passed a truck/bus with a flat. However, readers often overlook discrepancies between presupposed (given) sentence information and existing knowledge. In spite of this, reading times in new experiments revealed (a) similar inconsistency-detection time for given and new information

and (b) similar Matching X Factivity (viz. believed versus knew) interactions for given and new information. These results support the robustness and generality of readers' validation processing.

(**292**)

Todd Ferretti [1] (tferrett@wlu.ca), Jeffrey Hong [1], Deanna Hall [1], James Siklos-Whillans [2]
Wilfrid Laurier University[1], *University of York*[2]

The Influence of Temporal Information Associated with Verbs and Visual Perspective on Imagining Events

The main goal of this research was to examine how temporal information associated with verbs (grammatical and semantic) combine with visual perspective (first vs. third person) to influence the ability to imagine events. A second goal was to examine the neurocognitive correlates of these processes by employing event-related brain potential methodology. Our results show that the inherent temporal semantics of verbs interact differentially with grammatical verb aspect and visual perspective to influence the ease of imagining events and also the content of those events. These results have implications for our understanding of how people mentally represent events denoted by verbs.

(**293**)

Peter Dixon (peter.dixon@ualberta.ca), Marisa Bortolussi
University of Alberta

The Role of the Deictic Centre in Narrative Comprehension and Interpretation

In narrative, the deictic centre is a position in the story world from which narrative events might be perceived. In order to demonstrate the importance of the deictic centre for narrative comprehension, we varied the attribution of a few percepts to characters. Although readers had no memory for the details of these attributions, they nonetheless affected the evaluation of the characters. We argue that readers attempt to find a simple heuristic for identifying the deictic centre based in part on constraints implied by perceptual attributions. In turn, the nature of that heuristic affects story and character interpretation.

•ψ•

Symposium: Interactive Social Cognition: An Emerging Science

River Building 1200
3:30 – 4:30 p.m.

(**294**)

Elina Birmingham (ebirming@sfu.ca>)
Simon Fraser University

Spontaneous Gaze Following within Face-to-Face Interactions: an Examination of Children and Adolescents with Autism Spectrum Disorders

A clinical characteristic of autism is reduced gaze following. However, this finding has mainly been observed in young children within semi-naturalistic interactions. Much of the research on older children and adults has occurred in the context of computerized "gaze cuing" paradigms, and has led to mixed findings. Here I present data from a naturalistic paradigm designed for measuring spontaneous gaze following in older children and adolescents. Implications for autism research and for research with neurotypical populations will be discussed.

(**295**)

Dana A Hayward [1] (dana.hayward@mail.mcgill.ca), Willa Voorhies [1], Sally Wong [2], Jelena Ristic [1]
McGill University[1], *University of Toronto*[2],

Searching for Social Attention in Real Life Social Interactions

Social attention is often indexed by faster responses to gazed-at relative to not gazed-at targets in a cuing task. However, it remains unknown how this laboratory effect relates to attentional processes occurring during real world social interactions. Here we examined the relationship between experimental measures of social attention and various instances of social

attentive behaviors in live interactions as a function of individual differences in social competence. While indices of real world social behaviors were predictably related to variability in social competence, few of those measures were related to the laboratory measure of social attention.

(**296**)

Janeen Loehr (janeen.loehr@usask.ca)
University of Saskatchewan

Shared Goals and Shared Control: Neurocognitive Processes and Phenomenology of Joint Action

People often coordinate their actions with other people to achieve shared goals such as scoring a goal in hockey or moving a couch from one location to another. This talk will discuss the cognitive and neural processes that allow people to share goals with each other, including action representations that incorporate shared goals and action monitoring processes that differentiate own from shared goals. People's experiences of shared control over shared goals, and the implications of these experiences for goal-related processing, will also be discussed.

(**297**)

Ana Pesquita [1] (anapesquita@psych.ubc.ca), Craig S. Chapman [2], James T. Enns [1]
University of British Columbia [1], *University of Alberta* [2]

Social Cueing: Seeing Decision-Making in Action

One of the ways humans predict each other's behavior may be to model the other's attentional state as expressed in body language (Graziano, 2012). We tested whether observing another's online decision-making could serve as a spatial attention cue. Participants viewed videos of actors reaching to one of two locations under choice (actors decides) versus direction (actor is instructed). Participants predicted the location more efficiently on choice than on directed trials, even after masking the actors' faces. Higher social-intelligence correlated with greater prediction ability. We conclude that humans perceive decision-making cues in body language to generate predictive models of social counterparts.

Poster Session 3

Saturday June 6th (4:30 – 6:00 p.m.)
River Building 2220, 2224, 2228

(300)

Carla Sowinski (carla.sowinski@carleton.ca), Feng Gu, Ryan Pusiak, Jo-Anne LeFevre
Carleton University

Predictors of arithmetic fluency in adults: Linking symbols to quantities

Undergraduates (N = 89) completed an arithmetic fluency measure, as well as speeded measures of subitizing (i.e., identification of small quantities, ≤3), small digit identification (i.e., 1 – 3), symbolic magnitude comparison, and nonsymbolic magnitude comparison. Despite significant intercorrelations among all variables, multiple regression analyses revealed that performance on the subitizing and symbolic magnitude comparison were the only significant predictors of mathematics calculation fluency. The potential theoretical importance of subitizing and symbolic magnitude comparison skills will be discussed.

(301)

Randi Alison Doyle (randi.doyle@unb.ca), Daniel Voyer
University of New Brunswick

Real bodies and occlusion: Item types, cognitive strategies, and gender differences in mental rotation

The current study investigated potential causes of reduced accuracy reported by Doyle and Voyer (2013) on a mental rotations test (MRT) using computer-drawn human figures as stimuli compared to a block figures MRT. Accordingly, we constructed a new MRT using real human models as stimuli. The results obtained by Doyle and Voyer were not replicated. In fact, women's scores improved significantly more than men's scores on the real human figures test compared to the blocks test. This finding suggests a strategy shift as a function of stimulus type for women but not men with human figures.

(302)

Marc-André Goulet (mgoul101@uottawa.ca), Denis Cousineau
University of Ottawa

Wait for it: what modifying inter-stimuli interval in a comparison task tells about priming effects and visual working memory.

A common finding in comparison task is the fast-same phenomenon, where "same" responses are faster than "different" responses (Bamber, 1969). A recent study by Jacob and al. (2013) explored the effect of modifying inter-stimuli interval on the response times (RT). They found that the differences in RTs (ΔRT) changed with ISI, suggesting modulations of memory processes. In this study, we added two variables (a) the complexity of the stimuli and (b) the amount of differences manipulated across six different inter-stimuli intervals. We replicated Jacob et al. in the complexity=1 condition; with increased complexity, ΔRT benefit from larger ISI, congruent with a memory explanation.

(303)

Michael David Klein (mdklein@uwaterloo.ca), Jennifer A Stolz
University of Waterloo

Distorted subjective time during the dual-task bottleneck is not caused by delayed stimulus perception.

Concurrent cognitive loads diminish our ability to estimate time durations. Previous work with the Psychological Refractory Period paradigm suggests that due to a high load, when estimating their response time to Task 2, subjects fail to perceive slack time, instead timing from the onset of central processing of Task 2. We test whether this failure is due to delayed conscious perception of the Task 2 stimulus, or an inability to estimate

duration during the dual-task bottleneck. Findings show that, under conditions where conscious perception is not delayed, subjects still fail to perceive slack time.

(304)

Bradley Harding (bhard024@uottawa.ca), Marc-André Goulet, Vincent Leblanc, Christophe Tremblay, Sylvain Chartier, Denis Cousineau
University of Ottawa

Is Systems Factorial Technology capable of false positives? An SFT analysis applied to the Linear Ballistic Accumulator.

Systems Factorial Technology (SFT) is a methodology capable of discerning five types of architectures involving two sub-processes. While reliable, SFT can wrongfully identify architectures (Tremblay et al., 2014). Here we explore the Linear Ballistic Accumulator (LBA; Brown & Heathcote, 2008), a sequential sampling model, embedded within a coactive architecture. SFT is able to correctly diagnose this model as being coactive only when the random threshold has little-to-no variability. As the variability of the thresholds augments, SFT wrongfully diagnoses the architecture as being parallel self-terminating. As variability in thresholds is a necessary component of RT modelling, complementary diagnostic tools are needed.

(305)

Andriy Struk (astruk@uwaterloo.ca), Abigail Scholer, James Danckert
University of Waterloo

Low Perceived Control Predicts Engagement and Diminished Boredom.

Existing theories predict that both high and low perceived control lead to boredom. We challenge this view by demonstrating that low control, can be an engaging state. We induced high or low perceived control using a computerized version of rock-paper-scissors in which individuals arbitrarily either won or lost, respectively, regardless of their own play strategy. Results indicated that participants in the low perceived control condition were prompted to establish control as evidenced by elevated task response variability and frustration. Consequently, individuals in this condition reported being less bored than individuals in the high perceived control condition where wins came easily.

(306*)

Mario Enrique Doyle (med212@mun.ca)
Memorial University

The Effect of Success on Metacognition and Category Learning

The purpose of the present study was to examine perceptions of learning during a category learning task, and to compare perceptions to performance. Participants learned different categories (of birds (E1) or paintings (E2)), of both high and low variability, and made category learning judgments (CLJs) during learning. Results showed that correct trials were more likely to occur if the previous trial within a category had been correct. CLJs increased the most when a trial was correct following a prior incorrect trial within that category and tended to decrease when an incorrect trial followed a correct trial.

(308)

Sarah Nugent Rigby (umrigby@myumanitoba.ca)
University of Manitoba

Dynamic Face Processing in Adults with and without Autism Spectrum Disorders

Individuals with autism spectrum disorders (ASD) experience difficulties with social perception (Barton et al., 2007). We investigated how adults with and without ASD performed on static and dynamic versions of a simultaneous identity-matching task, and on Garner tasks assessing interference between identity and expression processing. Participants with ASD showed lower sensitivity to facial identity than controls in the matching task. Moreover, whereas controls showed a drop in interference between identity and expression processing when dynamic cues were made available, those with ASD did not. These findings add to the literature suggesting that individuals with ASD process faces atypically.

(309)

Mélanie Perron (mperron@laurentian.ca), Annie Roy-Charland, Cheryl Young, Jessica Boulard, Justin Chamberland
Laurentian University

The Confusion of Fear and Surprise: A Developmental Study of the Perceptual-Attentional Limitation Hypothesis using Eye Movements

The goal of the study was to test the perceptual-attention limitation hypothesis in children and adults by manipulating the distinctiveness between expressions and recording eye-movements. Children 3-5, 9-11 years old and adults were presented pairs of expressions and required to identify a target emotion. Children 3-5 were less accurate than those 9-11 and adults. Children viewed pictures longer than adults but did not spend more time attending to the relevant cues. Use of distinctive indices varied as a function of group. Results extend on the perceptual-attentional limitation hypothesis showing an importance decoder and stimuli, and an interaction between these factors.

(310)

Elie Ohana (eohana@uwaterloo.ca), Evan Risko, Derek Besner
University of Waterloo

The Numerical Distance Effect and Order: A Double Dissociation Between Online and Duration Measures

Researchers in numerical cognition have heavily investigated the numerical distance effect (NDE) where identifying which of two numbers is larger is strongly affected by the numerical distance between them. The present investigation used vocal responses so as to investigate response onset and duration. Participants completed a numerical comparison task and we considered the influence of numerical distance and order (i.e., ascending; (e.g., 1 2) vs. descending pairs; 2 1). A standard NDE was found in vocal onset, but not on duration. In contrast, Order had an effect on duration, but not onset. Implications for understanding the time-course of numerical comparison are discussed.

(311)

Feng Gu (feng_gu@carleton.ca), Jo-Anne LeFevre
Carleton University

A Re-Examination of "Groupitizing": The Effect of Number of Groups

Starkey and McCandliss (2014) showed that children counted 5 to 7 dots more quickly when they were presented in three groups of 1 to 4 dots than when they were not grouped. This effect was termed "groupitizing" in analogy to the perceptual phenomenon of subitizing. Adults (N=54) enumerated 1 to 9 dots presented as unstructured collections or in groups of 2 to 4. We found that grouping depends on group size as much as on number of groups. We propose an alternative explanation of the effects of grouping that involves cognitive (i.e., addition) rather than perceptual (i.e., groupitizing) processes.

(312)

Serena Lynch (slynch@laurentian.ca), Michelle Graham, Justin Chamberland, Joel Dickinson
Laurentian University

An Independent Analysis of Schema Violation Using the Go/No Go Association Task

Previous research, using the Implicit Associations Test, demonstrated that a slowdown effect in regards to homosexual characters, especially homosexual male characters, exists. However, this task was not developed to observe individual gender attributes. The aim of the current research was to use the GNAT to explore these differences. The results of the current study revealed that a slowdown effect was not equal across the gender categories as it occurred more in homosexual males rather than in heterosexual males and females within schema incongruent trials. This outcome supports previous research using the IAT.

(313)

Mehreen Nadeem (mehreen@ualberta.ca), Peter Dixon
University of Alberta

Does Semantic Priming Affect Perception or Motor Processes?

Semantic priming is known to affect actions. For example, "SMALL" or "LARGE" on an object affects grip aperture. Here, we presented "LONG" or "SHORT" shortly before, during, or after the brief presentation of a line and measured the length of the movement to the line's endpoint. Priming was observed only with early presentation of the word. Further, little priming was observed when the apparent line length was not relevant to the required movements. These results suggest that semantic priming affects the representation of the line length, not the planning or control of the movement.

(314)

Lisa Hodgson (lisa-hodgson@mytru.ca), Catherine Ortner
Thompson Rivers University

Different consequences of generating and choosing labels during affect labeling

Labeling one's emotional experience (affect labeling) is thought to have beneficial consequences for emotional experience, facilitating subsequent emotion regulation and reducing the intensity of one's emotional response. This study explored the behaviors associated with affect labeling using two different instructional methods, a matching style and self-generated style. The type of labeling group had a significant effect on response time, $t(47) = 2.37$, $p = .02$, indicating that the self-generated group took longer to label their emotions than the matching group did. Groups did not vary in their use of additional emotion regulation strategies, $F(6, 42) = .872$, n.s.

(315)

Kayla J.J. Beasley (kj_beasley@laurentian.ca), Justin A Chamberland, Joel Dickinson
Laurentian University

The Importance of Verbatim Report: A Between-Subjects Investigation

Previous research manipulated the visual verb within task instructions and examined both response time and P300 differences in response to a stimulus using a within-subject oddball task. Response time and P300 differences between verb categories indicated the possibility of processing differences, however, these results could also have been a result of task-switching given the nature a within-subject design. The current research used a between-subject oddball task to control for task switching and measure response time to stimuli following a specific task instruction. Results provide support for the task-switching account.

(316)

Pete Wegier (pwegier@psych.ryerson.ca), Laura J. Bianchi, Julia Spaniol
Ryerson University

Patterns of search in experiential sampling: Investigating piecewise search

In experiential sampling paradigms, one option may be searched comprehensively before switching to the second, or options may be searched using a constant-switch piecewise pattern. From past studies we have observed piecewise sampling greatly improved performance in judgments of frequency. Here we investigated enforced search patterns in an experience-based expected value estimation task. Piecewise sampling resulted in significantly higher accuracy for relative judgments of expected value, while in absolute judgments of expected value both patterns resulted in equivalent levels of accuracy. These findings demonstrate the importance of appropriate strategy selection in experience-based decision tasks and its interaction with choice format.

(317)

Sylvain Chartier (sylvain.chartier@uottawa.ca), Matt Ross
University of Ottawa

Neural principal component analysis for learning multiple datasets

Natural data usually contains noise. In the context of learning, this noisy input can quickly saturate the memory of artificial neural networks. One way to deal with noise is to apply dimensionality reduction to project the data into a lower dimensional space while still conserving as much information as possible. The present study proposes that a set of principal components from one dataset might be used to speed up the learning

of a second dataset. Using a generalized Hebbian algorithm it can be shown that the principal components from one dataset can speed up learning of the second if the latter is similar.

(318)

Daniela Caruso (CarusoD@macewan.ca), Tara Vongpaisal
MacEwan University

Auditory-motor interactions in the music production of musicians and non-musicians

Adult non-musicians and trained pianists learned musical sequences from an animation-based training paradigm designed to remove the constraints of learning from standard musical notation used in previous research. The transfer of this learning was examined in conditions involving a change in the melodic or motor pattern separately, in both patterns simultaneously, or no change. Although non-musicians performed melodic sequences with longer durations, they demonstrated the same patterns of difficulty in the transfer of learning across conditions as trained pianists. Our findings suggest that the mechanisms underlying auditory and motor learning in skilled music performance are similar in musicians and non-musicians.

(319)

Christopher Lee (clee1992@alumni.ubc.ca), Anna Maslany, Peter Graf
University of British Columbia

Valence Contamination

Pictures may trigger powerful emotions, which are likely to affect our perception and evaluation of related or unrelated stimuli. To investigate this possibility, we showed participants sequences of 5 pictures with all pictures in a sequence from the same valence bin (e.g., positive). Immediately following each sequence, we displayed a target picture either from the same or different valence bin. Subjects rated the valence of each picture on an 8-point scale. The results showed that negative target pictures, for example, were rated as more negative when presented in the context of negative pictures, as compared to neutral or positive pictures.

(320)

Julie Conder (conderj@mcmaster.ca), Karin R Humphreys, Scott Watter
McMaster University

Expert Video Game Players Show No Cognitive Control Advantage in Task Switching

Expert video game players (VGPs) routinely show superior performance on cognitive tasks compared to non-gamers (nVGPs). In task switching paradigms, observed performance differences have been interpreted as superior cognitive control in VGPs. We compared VGP and nVGP performance in task switching, manipulating task set overlap and trial timing. While VGPs showed overall faster responses, with some benefit in conditions requiring less endogenous control, there was no switch cost benefit for VGPs with high endogenous control demands. We argue that the VGP performance benefit is not due to superior cognitive control.

(321)

Stefania Cerisano (cerisas@mcmaster.ca), Julie Conder, Karin R Humphreys, Scott Watter
McMaster University

Expert Video Game Players Show No Cognitive Control Benefit in N-Back Performance

Expert video game players (VGPs) often out-perform non-gamers (nVGPs) on a variety of cognitive tasks. We investigated whether this VGP advantage may be due to enhanced cognitive control. VGPs and nVGPs performed verbal and spatial n-back tasks, with variable levels of cognitive control difficulty (2- versus 3-back, presence/absence of lures). VGP versus nVGP performance did not differ across levels of cognitive control demand in verbal tasks, but VGPs showed performance benefits selectively on difficult spatial tasks. VGPs show a spatial processing advantage, but no benefit in modality-general cognitive control.

(322)

Matthew Gerald Huebner (matthewhuebner@cmail.carleton.ca), Andrea Howard, Jo-Anne LeFevre
Carleton University

What we say versus where we look: Assessing Procedure Use in a Simple Addition Task with Eye-Movement Patterns

Adults typically show a latency disadvantage when they use procedural strategies (i.e., counting) to solve simple arithmetic (e.g., 9 + 12) compared to direct retrieval. In the present study, we examined how this extra time was allocated across problem components when participants solved basic addition and reported their solution processes. Retrievers fixated primarily on the operator, irrespective of problem size. Transformers fixated more on the operands for larger problems and counters fixated more on the operands across all problem-size categories. The use of eye tracking in simple arithmetic research potentially highlights the attentional processes required for specific solution strategies.

(323)

Ryan John Patrick Pusiak (ryanpusiak@cmail.carleton.ca)
Carleton University

Arithmetic and Eye Tracking: Addition and Multiplication

Do eye-movement patterns of addition and multiplication problems differ? Participants (n = 41) solved addition and multiplication problems in one mixed and two pure blocks. Eye movement patterns in pure blocks were similar to those observed in previous studies. Participants looked longer at the operation sign than at the operands. In the mixed block, participants looked at the operation sign more than in the pure blocks, and this difference was greater for large problems than for small problems. It appears that eye-movements in simple arithmetic vary according to task demands.

(324)

Robyn Carson (rcars035@uottawa.ca), Alain Desrochers, Aude Beauchemin, Kayla Soosaar
University of Ottawa

Processing singular and plural nouns: When does surface frequency play a role?

The word frequency effect is the most robust effect within the word recognition literature (Norris, 2006). Yet, little research has focused on how words' unique frequency (i.e., their surface frequency) impacts word recognition, leading to a mixture of conflicting results. Thus, this study investigates how surface frequency influences word recognition in English and French using lexical decision and number decision tasks. Lexical decision results support the argument that surface frequency is only accessed when identifying words that occur more frequently in their singular form. Number decision results are more complex due to participants adopting disparate response strategies.

(325)

Melissa J Ptok [1] (ptokmj@mcmaster.ca), Sandra J Thomson [2], Scott Watter [1], Karin R Humphreys [1]
McMaster University[1], *St. Thomas University*[2]

Stage-Specific Attentional Mechanisms of Desirable Difficulty

The "desirable difficulty" effect describes many situations where increased difficulty during initial learning can enhance later memory performance. A wide range of experimental situations have had mixed success in producing these effects. We propose a processing stage-specific model of selective attention/cognitive control demand in producing desirable difficulty effects, consistent with established information processing approaches. Across several experiments, we show typical priming and interference effects at different processing stages. These reliably influence overt reaction time performance, but only show later memory facilitation when difficulty is selectively targeted at semantic representations of stimulus identity.

(326)

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Temporal perception of supra-threshold object representations: Effects of object-substitution masking

Object-substitution masking using near threshold stimulus presentations (<50 ms) has been shown to impair conscious detection of a target object. To examine whether this impairment results from termination of an ongoing process involved in object consolidation, the current study combined a two-target temporal order judgment task with object-substitution masking (OSM) of supra-threshold objects. Findings are consistent with OSM interrupting recurrent communication between early and late visual areas following object formation. Specifically, two experiments show that OSM reduces the perceived duration of a supra-threshold target object and provide the first evidence of OSM exerting effects on supra-threshold stimuli.

(327)

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You'll change more than I will: Adults' predictions about their own and others' future preferences

Undergraduates' predictions about future changes in preferences were assessed by having them rate how much they or a hypothetical sex- and age-matched peer liked/would like stereotypically young- and old-person items (e.g., adventure vacations vs. cruises) now and at age 70, or how much a generic 70-year-old same-sex adult would like these items now. Participants predicted less change between their own current and future preferences compared to a peer, but estimated that their peer would like stereotypically-young items more in the future and stereotypically-old items less than a current-day older adult. Implications for cognitive mechanisms underlying prediction biases are discussed.

(328)

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An Order of Magnitude: Symbolic and Non-Symbolic Ordinality as Predictors of Exact and Approximate Calculation in Adults

Performance on symbolic and non-symbolic numeric order determination tasks were examined as predictors of Woodcock Johnson calculation (exact) and computation estimation (approximate) scores. Woodcock Johnson scores were only predicted by the symbolic task. Computational estimation scores were only predicted by the non-symbolic task. When controlling for general math ability, the non-symbolic task remained predictive of computational estimation scores. Predictors remained significant after controlling for non-numerical (luminance) order determination tasks through regression. These findings suggest that 1) the relations are due to numeric judgements, and 2) symbolic and non-symbolic number system performance uniquely relate to different mathematical outcome measures.

(329)

Justin A Chamberland (ja_chamberland@laurentian.ca), Kayla Beasley, Melissa Laurin, Nakita-Rose Morrisseau, Brigitte North, Margaret Osborne, Selma Ozhan
Laurentian University

The Impact of Display Time; Confusion between Emotional Facial Expressions of Fear and Surprise

The purpose of the current study was to further explore the impact of display time on the recognition of emotional facial expressions. More specifically, this study was conducted with prototypes of fear and surprise, which may share up to four action units. The perceptual-attentional limitation hypothesis suggests that these shared action units may account for the confusion of fear with surprise. The current study sought to explore whether the results obtained by previous studies would be impacted by manipulating display time. Results indicate that display time does have an impact. Implications on emotional facial expression research are discussed.

(330)

Heather Douglas (heather.douglas@sympatico.ca), Jo-Anne LeFevre, Kelsey MacKay
Carleton University

Math Anxiety: Not just a Numbers Game

We examined cognitive and affective influences on mathematical performance. Adults (n = 74) completed measures of math anxiety, working memory, basic quantitative and symbolic knowledge, and mathematical skill. Math anxiety was a unique predictor of mathematical performance, independent of quantitative knowledge, spatial skills, and working memory. These findings suggest that the role of math anxiety in complex mathematical skill goes beyond cognitive factors. We speculate that confidence building alongside skill building may help ameliorate math anxiety.

(331)

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Nipissing University

The Effects of Aging on Visual Distraction in a Modified Stroop Task

Using a modified Stroop task, this research assessed the extent that older adults may be more distracted, than younger adults, by task-irrelevant, visual information. On each trial participants identified a colour (red, yellow, green, blue, or brown) presented in the centre of a computer screen while ignoring incongruent colour words or non-colour words presented at one of five possible location (centered, 4.5°, or 7.6° visual angle left or right of centre). Although both groups showed a significant Stroop interference effect at all positions, it was only in the centre position that this effect significantly differed between younger and older adults.

(332)

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Carleton University[1], *University of Waterloo*[2]

Nimage: Using visible persistence to constrain a model of visual processing

Nimage is a spiking neural network model implemented in Nengo that simulates the storage of a mental image in a visual buffer in V1. Stored representations degrade after stimulus offset in a manner that parallels findings in visible persistence paradigms. Some paradigms measuring visible persistence duration yield diverging estimates. Divergence in estimates may be due to variable participant response strategies between paradigms. Given a response strategy, Nimage provides an estimate of the duration of visible persistence. Given appropriate global parameters, these estimates match the data. Thus, visible persistence paradigms can constrain theory on the organization of the visual cortex.

(333)

Shawn Tan (shawn.tan@carleton.ca), Jo-Anne LeFevre
Carleton University

Tracking eye movements during mental division

We used eye tracking to investigate the cognitive processes underlying mental division. Participants solved division problems in multiplication (72 = 8 x _) or division (72 ÷ 8 =_) format and described the procedure that was used. We also recorded dwell times on elements in the problems. A problem size effect for both multiplication and division formats was observed and there was a slight advantage of multiplication over the division format. Initial analysis revealed longer average dwell times on the "÷" symbol for division formats and on the divisor and the "x" symbol for multiplication formats.

(334)

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University of Ottawa

Facial Emotion Recognition and Reaction in a Non-suicidal Self-injury Population

Non-suicidal self-injury (NSSI) is a clinically significant behaviour affecting many youth. Emotion regulation is frequently cited as a primary motivation for NSSI. Research suggests that difficulty regulating emotions affects one's processing of facial expressions. To investigate whether NSSI is associated with differences in processing expressions, an emotion-recognition

task was performed. Preliminary results suggest trends towards NSSI being associated with an advantage in accuracy for recognizing fearful (p = .051) and sad faces (p=.054). Moreover, strong positive correlations were found between emotional regulation functions and accuracy in recognizing fearful (r=.733) and sad (r=.854) expressions. Facial mimicry (EMG) data collection is ongoing.

(335)

Ellen K MacLellan (maclele@mcmaster.ca), David I Shore, Bruce Milliken
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Blended control over T1 encoding in the attentional blink (AB)

Selectively attending to a first target (T1) appears to require limited capacity encoding resources that are then unavailable for consolidation of a second target (T2) presented shortly thereafter. This effect is commonly referred to as an attentional blink (AB). In the present study, we examined how prior experience controls the T1 encoding process. Participants viewed a pre-T1 target stimulus that was either similar or dissimilar to T1, and we examined how pre-T1 target similarity affected T1 encoding and the AB. The results suggest that such similarity effects exist, but that they are modulated strongly by attentional set.

(336)

Charles Collin [1] (Charles.Collin@uottawa.ca), Chantal Lemieux [1], Nicholas N Watier [2]
University of Ottawa [1], *Brandon University* [2]

Gender Differences in Metacognitive Judgements of Navigational Learning

Metacognition refers to the ability to monitor and control one's cognitive processes. In two experiments we examined whether gender differences in metacognition and in navigational performance were related. Participants viewed video tours of virtual 3D mazes and were asked how confident they were that they could navigate each maze without error. Participants then navigated through each maze and confidence judgments were compared with performance. Results showed that men outperformed women, but that both genders were poor at predicting their performance. Men's retrospective confidence was more highly correlated with performance than women's.

(337)

Doug W Alards-Tomalin (d.w.tomalin@gmail.com), Hillary Nepon, Launa C Leboe-McGowan
University of Manitoba

Number Direction and Its Impact on Perceived Sound Loudness

In three experiments the cross-modal influence of passively viewing, and holding in short term memory information about the direction of a visually presented numerical sequence (increase: 1-2-3-5, decrease 9-8-7-6-5, random: 8-4-3-2-9) on unrelated judgments regarding a sound's intensity level (loudness) was examined. In experiment 1, on every trial, the participants witnessed a numerical sequence first and reported it's direction (increasing, decreasing, random). Following this task, they judged whether the second of two consecutive tones was louder or quieter. When the tasks were broken apart in this manner, there was no impact of the number sequence's direction on the loudness judgment task. In Experiment 2, the target and reference tone immediately followed the numerical sequence, and on 25% of the trials the participants reported the direction of the numerical sequence, while on the other 75% they judged the target sound intensity. In Experiment 3, the same procedure was used, but the reference sound occurred prior to the number sequence and the target sound at the conclusion of the sequence. In both cases, the direction of the numerical sequence influenced sound intensity judgments. This finding suggests that holding information about a numerical sequence's direction in short term memory can subsequently bias sound intensity judgments in the same direction.

(338)

Tianshu Zhu (tianshu1991@msn.com), John Paul Minda
University of Western Ontario

The Effects of Self-Regulatory Depletion on the Two-Systems of Category Learning

The current study examines the hypothesis that self-regulation operates as a limited resource through assessing the performance on the two systems of category learning. We initially depleted some participants' self-regulatory capacity, while the other participants were not depleted. We assigned these participants to complete either a Rule-Defined (RD) or Non-Rule-Defined (NRD) category learning task. The RD category learning requires self-regulation, while the NRD category learning does not require self-regulation. It was expected that RD category learning would suffer significantly more from initial self-regulatory depletion compare to NRD category learning. We found that performance on both RD and NRD category learning were undermined by self-regulatory depletion, but NRD category learning suffered more.

(339)

Xuan Pan (xpan55@uwo.ca)
University of Western Ontario

The Relationship between Creativity and Cognitive Switching: Mediating Effect of Intelligence.

The present study focused on the relationship between cognitive switching, which is one subcomponent of executive function, and creativity by using latent variable analysis and structural equation modeling. Furthermore, the mediating effect of intelligence on the relationship between creativity and cognitive switching was explored. The results showed that: (1) cognitive switching ability had a positive relationship with creativity, but only on the quantitative aspects (fluency and flexibility). (2) Intelligence had a positive influence on both quantitative and qualitative aspects (originality) of creativity, and its effect on qualitative aspect was stronger than that on the quantitative aspect. (3) There was a significant mediating effect of intelligence on the relationship between creativity cognitive and switching.

(340)

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University of Prince Edward Island

The role of musical vs tone-language experience on implicit choice of key for singing a familiar song

A component of the AIRS Test Battery of Singing Skills (ATBSS) indicates the singer's implicitly chosen key for singing a familiar song under different contexts (No, C-training, E ♭ , Post-story). 20 Canadian musicians, 20 Canadian non-musicians, and 20 native Chinese non-musicians performed the online ATBSS (English and Mandarin versions respectively). The pitch of the first tonic note of the 4 contexts was compared. Chinese non-musicians and Canadian non-musicians performed equally but differed from musicians in the No, E ♭ and Post-story contexts (Mann-Whitney U, all p's $< .05$). Canadian non-musicians differed from the musicians after the C-training context ($p < .05$).

(341)

Alexander Cameron Walker (umwalk96@myumanitoba.ca), Doug Alards-Tomalin Joshua Shaw, Launa Leboe-McGowan
University of Manitoba

Is 9 Louder than 1? Audiovisual Cross-Modal Interactions between Number Magnitude and Judged Sound Intensity

The cross-modal impact of number magnitude (i.e. Arabic digits) on perceived sound loudness was examined. Participants compared a target sound's intensity level to a previously heard reference sound. Paired with each presented target sound was a task-irrelevant Arabic digit that varied in magnitude. First, when target sounds and digits occurred simultaneously, sounds paired with large digits were categorized as loud more frequently than those paired with small digits. Second, when these events were no longer simultaneous, number magnitude ceased to bias sound intensity

judgments. Lastly, when the task demanded that participants hold each digit in short-term memory, the bias returned.

(342)

Emily Ann Ready (eready2@uwo.ca), Lucy Marjorie Joanne McGarry, Cricia Rinchon, Jeffrey David Holmes, Jessica Adrienne Grahn
Western University

Free-walking rhythmic auditory stimulation: Effects of familiarity and groove on gait.

The current study manipulated parameters in music during rhythmic auditory stimulation (RAS), a technique used in gait rehabilitation for Parkinson's disease (PD). Typical RAS paradigms involve synchronizing footsteps to the beat. This can distract individuals with poor beat perception, which is affected in PD. Healthy participants walked freely on a sensor walkway to music selected based on individual ratings for familiarity and groove (desire to move to the music). High groove music produced greater stride length, while high familiarity music lead to increased stride velocity. These results suggest that individualized familiar, high-groove music supports stride length and speed while walking.

(343)

Brian D Robertson (brober4@uwo.ca)
University of Western Ontario

Dorsal striatum mediates cognitive control, not cognitive effort per se, in decision-making: An event-related fMRI study

Objective: Whether the dorsal striatum (DS) mediates cognitive control or cognitive effort is unclear because these effects are highly correlated. We implemented a task that disentangled these phenomena to specify the function DS mediates in decision-making. Methods: Participants completed a Stroop task with simultaneous blood-oxygenation-level-dependent response (BOLD) measurement. Results: DS BOLD signal only correlated with increased cognitive control requirements. DS was not preferentially activated when only cognitive effort requirements were manipulated, even when using liberal statistical criteria. Interpretation: We interpret these findings as support for the increasingly accepted notion that DS mediates cognitive control specifically and does not simply index cognitive effort per se.

(344)

Mark A. Brown (markbrownsemail@gmail.com), Miles Parkinson, Guy Lacroix
Carleton University

The Effect of Predictor and Criterion Spacing in Function Learning

Function learning research has long demonstrated that linear functions are easier to learn than nonlinear functions. Typically, however, the abstract function has been confounded with the spacing of the correct response values: response spacing is even for linear functions and uneven nonlinear functions. We manipulated the spacing of predictor and criterion values independently to explore this issue. Overall, the results suggest an advantage for linear functions regardless of response spacing. However, firm conclusions cannot be drawn about the nature of the interaction. Additionally, a qualitative analysis of interpolation responses suggests stimulus generalization may play a role in function learning.

(345)

Roberto G. de Almeida (Roberto.DeAlmeida@concordia.ca), Julie Turbide
Concordia University

The Role Of Verb-Propositional Complexity in Semantic Representation and Sentence Recall

Sentences with one proposition are recalled better in full than two-proposition sentences when number of words is held constant (Kintsch, 1974). We investigated the semantic representation of causative verbs using a memory for propositions technique. We contrasted sentences containing lexical causatives (boil), morphological causatives (thicken), simple transitives (taste), and periphrastic causatives (cause to boil). Results show no difference in full recall between lexical causatives and simple transitives. Furthermore,

causatives and transitives are recalled better in full than morphological and periphrastic causatives, thus supporting an atomistic account of lexical-conceptual representation (Fodor, 1998; de Almeida, 1999; Fodor & Pylyshyn, 2014).

(346)

Tanor Bonin (tanor.bonin@uwaterloo.ca), Daniel Smilek
University of Waterloo

Does Psychoacoustic Coherence Influence Cognitive and Affective Responses to Music?

The Source Dilemma Hypothesis predicts that dissonant musical experience arises from incoherent auditory perception. Here, participants completed a visual 2-back task while listening to musical stimuli of varied psychoacoustic coherence and provided affective appraisals of each musical stimulus. In Experiment 1, inharmonic music elicited increased cognitive load and increased negative affect compared to harmonic music. In Experiment 2, strengthening the timbrel and spatial coherence of inharmonic music increased cognitive load and decreased negative affect. We discuss the implications of these results for future music cognition and auditory perception research.

(347)

Nalini Elisa Ramlakhan (naliniramlakhan@cmail.carleton.ca)
Carleton University

Morality and the Emotions

Empathy is often viewed as the core of moral behaviour and moral judgment, and that without empathy, an individual is incapable of morality. My previous research suggests that empathy is not necessary for morality, although it may play a marginal role in morality. Rather, emotions such as disgust, distress, and fear play a significant role in morality. The present study analyzed studies on emotion and morality to determine which emotions are necessary for morality. The results suggest that disgust is a significant emotion for moral judgment while distress plays an important role in moral or helping behaviour.

(348)

Joey Legere, Ksenia Gueletina, Mahyar Garmsiri, Kyle Comishen, Nicole LeBarr, Catherine Connelly, Judith Shedden (shedden@mcmaster.ca)
McMaster University

Technological factors as modulators of processing fluency in video communication

Online conversations are fundamentally different from face-to-face interactions.
In a video call, technological factors such as video quality and internet connectivity can affect the fluency of the interaction, which may affect how participants view each other. This may be detrimental in an online interview, where an interviewer could misattribute perceived disfluency to the quality of an applicant. Our lab has created a dynamic stimulus set to investigate variables that could affect fluency in online interactions, and their effect in the context of a job interview. We will discuss how specific sources of disfluency can affect attribute judgments.

(349)

Julie Chang (jchang@psych.ubc.ca), Peter Graf
University of British Columbia

Levels of acculturation are associated with executive-function task performances

Cross-cultural research has revealed developmental differences in executive functions. In line with this finding, we predicted that performance on inhibitory control tasks and on other executive-function tasks would be correlated with the degree of acculturation of adults in our society (i.e., their assimilation of the values of the mainstream individualistic culture). By contrast to previous research, our investigation with UBC students revealed a positive correlation between acculturation to the dominant local culture and performance on working memory tasks as well as on some tasks requiring inhibition. Findings are discussed in terms of acculturation influences and potential interlingual interference.

(350)

Irene Reppa (i.reppa@swansea.ac.uk), Kate Elizabeth Williams
Swansea University

The Representation of Colour in Object Memory: Evidence from Recognition-Induced Forgetting.

Does episodic memory for objects encode colour information? If so, is such encoding ubiquitous or ad hoc? The current experiments examined whether a sensitive, indirect method of probing episodic memory might reveal that colour is ubiquitously represented for familiar and novel objects. Participants studied pictures of objects, and then practiced recognition of a subset of those objects. Unpracticed objects shared either shape only (Rp-Shape), colour only (Rp-Colour), shape and colour (Rp-Both), or neither shape nor colour (Rp-Neither), with the practiced objects. Interference in memory between practiced and unpracticed items were revealed in the forgetting of unpracticed items (RIF). RIF was significant for Rp-Shape and Rp-Colour objects, suggesting that shape and colour are represented and both drive competition effects in episodic object memory, suggesting that colour is a ubiquitously represented feature in object representations.

Poster Session 4

Sunday June 7th (11:30 a.m. – 12:45 p.m.)
River Building 2220, 2224, 2228

(**400**)

Nicolas Narvaez Linares (nnarv038@uottawa.ca), Patricia Barra de la Tremblaye, Hélène Plamondon
University of Ottawa

Neuropeptide CRH modulates brain plasticity in the mesocorticolimbic network: Role in modulating dopamine and social behavior following a cerebral ischemia.

Corticotropin-releasing hormone (CRH) is involved in the regulation of emotional disorders, including depression, which is common following a cerebrovascular accident (CVA).The activation of the CRH 1 receptor (CRHR1) can modulate the levels of plasticity markers in brain regions involved in emotional disorders like the dopaminergic mesolimbic regions. In this study, Wistar male rats (N = 70) received a specific CRHR1 antagonist, or saline solution (Sal). Behavioral tests were used to assess emotional behavior and immunohistochemical analysis was performed to measure the expression of the plasticity markers in the regions of interest. Our results highlighted the role of CRH signaling in the regulation of post-ischemic emotional and social behavior.

(**401**)

Jean Gagnon [1](jean.gagnon@umontreal.ca) , Mercédès Aubin [1], Alex Fernet Brochu [1], Sophie Derguy [1], Monique Bessette [2], Pierre Jolicoeur [1]
University of Montreal[1], *Institut Victoria*[2]

The development of an event-related brain potential measure to investigate the hostile attribution bias

Although hostile attribution bias (tendency to interpret the intention of others as hostile in ambiguous social contexts) has been associated with impulsive aggression, the complete sequence of social cognitions leading to aggression are poorly understood. We tested if the N400 component of the ERP can be elicited by a violation of expectations about the intent of others from ambiguous social provocations. We found an N400 for expectation violation in non-hostile contexts, but not hostile contexts. This N400 may reflect higher demands of building a situation model in the case of an inconsistency after a non-hostile script is activated in non-clinical individuals.

(**402**)

Bertrand Sager [1] (bsager@sfu.ca), Elisabeth Kreykenbohm [2], Thomas M Spalek [1]
Simon Fraser University[1], *Kwantlen Polytechnic University*[2]

Change-blindness in a driving simulator: A test of motorcycle conspicuity

Motorcyclists are often involved in right-of-way collisions where the driver of a car "looked but failed to see" the motorcycle before turning left across the motorcyclist's path. Motorcycle safety research assumes that this is due to a lack of motorcycle conspicuity but this assumption has not been empirically tested. The two driving simulator change-blindness experiments presented here reveal that motorcycles are detected at least as often as cars in busy traffic environments. These experiments cast doubt on the assumption that motorcycles are hard to see; we suggest that future research should instead focus on driver judgement and attention.

(**403**)

Elisabeth Kreykenbohm [2] (elisabeth.kreykenbohm@kwantlen.net), Bertrand Sager [1], Farhad N Dastur [2], David J Froc [2], Daniel M Bernstein [2]
Simon Fraser University[1], *Kwantlen Polytechnic University*[2]

Motorcycles are not invisible: Examining motorcycle conspicuity using change-blindness and eye-tracking

Multi-vehicle motorcycle collisions are commonly attributed to poor motorcycle conspicuity, but this attribution lacks empirical support. We used an eye tracker to examine gaze patterns in a change-blindness experiment, with cars and motorcycles as targets in images of common traffic scenes. We found higher detection rates for motorcycles compared to cars. Additionally, gaze data did not follow the saliency maps we constructed for our stimuli, suggesting that participants employ top-down traffic-based search schemas. We argue that multi-vehicle motorcycle collisions are not due to poor conspicuity, but to perceptual factors that make it difficult to judge an oncoming motorcycle's speed.

(**404***)

Paul Seli (pseli@uwaterloo.ca), Jeffrey Wammes, Daniel Smilek
University of Waterloo

Can People Strategically Mind-Wander?

We examined the hypothesis that people can modulate their mind-wandering based on their expectations of upcoming challenges in a task. To this end, we developed a modified version of the Sustained-Attention-to-Response-Task in which infrequent high-demand target trials were presented in a predictable manner. During the task, we intermittently presented participants experience-sampling probes to determine whether they were mind-wandering or focused on the task. Consistent with our hypothesis, the results showed that participants decreased their levels of mind-wandering as they approached the predictable target trials. Critically, these results demonstrate that people can and do modulate their mind-wandering on a moment-to-moment basis.

(**405**)

Corie Ann Flesch (ca_flesch@laurentian.ca), Leïla Reguigui, Annie Roy-Charland
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Alcohol consumption and attentional bias: A study of individuals in treatment and binge drinkers

Research has found empirical evidence linking excessive alcohol consumption and the presence of attentional biases. This link has been established based on artificial implicit tasks that might not allow for generalization to everyday circumstances. We used eye movements to observe the effect of alcohol consumption on alcohol-related attentional biases in complex scenes. Results revealed that binge drinkers fixated interest areas faster than light drinkers and individuals in treatment, regardless of the content of the zone (alcohol or neutral). Individuals in treatment spent significantly more time than light drinkers in the interest areas, regardless of content (alcohol-related or not).

(**406**)

Brian Douglas (bdouglas@uoguelph.ca), Harvey Marmurek
University of Guelph

Comparing Divided Attention Performance to Models of Focused Attention

Three experiments compare performance on a Stroop-like divided attention task and models of focused attention using integrated and separated word/colour pairs. Experiment 1 compared Stroop and detection tasks. Experiment 2 measured the impact of Stroop task training on detection task performance. Experiment 3 measured the performance impact of extended training on the detection task. Without practice, participants were equivalently fast detecting words and colours using integrated pairs, and faster detecting colours using separated pairs. After training on either task, participants were faster detecting colours than words with both

stimulus types. Overall, the support a model that includes both early and late processing components best characterizes performance on the detection task.

(**407**)

Britt Anderson (britt@uwaterloo.ca)
University of Waterloo

Exogenous Cues Differentially Affect Selection and Discrimination of Contrast

The effect of luminance cues on perception were estimated for both contrast selection and contrast discrimination. For selection the psychometric functions show shifts in the point of subjective equality consistent with contrast enhancement. When cue effects were evaluated based on participants' direct reports there was no change in contrast appearance as a function of the cue. This dissociation between choice probability and direct report was even found when participants made both judgments for the exact same physical stimulus. In summary, the effects of an uninformative luminance cue depend on whether a person is making a selection or performing a discriminative judgment. Contrast affects on appearance are multiple, and depend on the method of assessment.

(**408**)

Brandon P Vasquez (bvasquez@research.baycrest.org), Nicole D Anderson
University of Toronto

The effect of feedback on response time consistency varies with age

Response time intra-individual variability (RTIIV) from trial to trial increases with age and is thought to represent the fidelity of executive control mechanisms. One past study demonstrated that goal-directed feedback ameliorated RTIIV in healthy older adults. The present study evaluated a similar training paradigm in healthy adults (18-30, 65-74, 75-85) to determine whether the effects transfer to an untrained task, and to examine the relationship with executive functioning. We found that feedback training led to improvements in RT consistency on the trained task, but did not transfer, and that training success was positively related to executive ability in adults 75-85.

(**409**)

Effie J. Pereira (effie.pereira@mail.mcgill.ca), Lauri Gurguryan, Jelena Ristic
McGill University

Controlling a Wandering Mind: Tasks dictate differences in estimates of mind wandering

Various measures of mind wandering (MW) appear to require different levels of attentional control. In this study, we assessed MW using four commonly-used procedures: experimenter-probed task, self-caught task, sustained attention to response task (SART), and real-world sampling. All measures were related predictably. MW estimates assessed with experimenter-caught, self-caught, and real-world tasks were positively related, while SART errors correlated negatively with the self-caught task. Overall, real-world sampling yielded the greatest estimate of MW. This suggests that MW estimates vary with the experimental method, possibly due to the amount of attentional control required by the task.

(**410**)

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McGill University

Remember me? Social working memory load affects social orienting.

Social orienting is marked by faster response times for gazed-at vs. not gazed-at targets. In contrast to this, recent work by McDonnell and Dodd (2013) showed that a face cue held in working memory led to inhibition of gazed-at targets. We investigated if this was due to participants holding face identity, gaze direction, or both pieces of information in working memory. Our data also indicated inhibition for gazed-at targets for all memory conditions, suggesting that social orienting is affected by social working memory load regardless of which part of the face is held in memory.

(411)

Anna Maslany (annamaslany@psych.ubc.ca), Rebecca Stanczyk, Ashlee Ko, Peter Graf
University of British Columbia

The beauty versus the beast: Exploring the relationship between affect and attention

Attention is determined by intrinsic attractiveness (positive valence) or repulsiveness (negative valence). The dominant theory suggests that attentional scope is broadened by attractive stimuli and narrowed by repulsive stimuli. We showed undergraduates picture sequences, with all pictures in a sequence from the same valence group, but valence group (extremely positive, positive, neutral, negative and extremely negative) varied across sequences. To assess attentional scope, after each sequence, participants completed Erikson flanker trials. We expected more flanker interference following positive than negative picture sequences. Results suggest that both positive and negative images cause attention to narrow, relative to neutral images.

(412)

Nathan Baron (baron_nathan@hotmail.com), Chris Oriet
University of Regina

The Effect of Local Statistical Summary Representation on Visual Search

Context guides attention towards a target in a visual display when either the statistical properties of the entire display, or the identity of individual items near the target, are preserved across trials. This study examines whether context can guide attention when only the statistical properties of distractors near the target are preserved. Context was built over 8 blocks of trials by retaining either the statistical properties or the identity of distractors near the target. Attentional guidance was then assessed by changing the context in the last 2 blocks. The results clarify the role of statistical summary representation in visual search.

(413)

Karine Elalouf (kelalouf@hotmail.com), Lucy Farisello, Jacob Applebaum, Jim G. Pfaus, Aaron P. Johnson
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Quantifying the variance in eye movements while watching intact versus scrambled movies

Eye movement (EM) analyses for dynamic stimuli often use 'swarm analysis' or dynamic heat maps, making it difficult to quantify similarities between observers. Here we demonstrate two quantitative measures: the bivariate contour ellipse area (BCEA), and the within-isoline area, and apply them to EM generated while watching an intact or scrambled movie. Both algorithms shows EM are more variable during the scrambled versus the intact movie, but the BCEA shows greater variance. We attribute this difference due to the assumption of normality in the BCEA calculation, and recommend the within-isoline area when describing group variance of EM in dynamic stimuli.

(414)

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Mind-wandering and reading difficulty: A tale of two effects

We examined the effect of reading difficulty on mind-wandering. In Experiment 1, we presented participants with passages one sentence at a time. We found more frequent mind-wandering during hard vs. easy passages. In Experiment 2, participants were presented with full pages of text. This more naturalistic presentation mode completely nullified the effect of passage difficulty on mind-wandering. These contrasting results point to the importance of ecological validity in mind-wandering research. We argue that the sentence-by-sentence presentation mode—a staple of mind-wandering and reading research—may yield results with low generalizability.

(415)

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Dalhousie University

Looking at endogenous prior entry effects in baseball judgements at first base

To examine whether Tichener's law of prior entry holds in a baseball context, participants were presented with close plays at first base. After each play, participants made a "Safe" or "Out" judgement, or reported the perceived colour of a disk flashed briefly over either the base or the glove. The biased presentation of coloured disks at one location or the other within a block was intended to endogenously orient attention towards that location. A novel colour wheel analysis was implemented and compared with the conventional analysis. The attentional manipulation was successful, but there was no visual prior entry effect.

(416)

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Université Laval

Is Working Memory Capacity Predictive of the Resistance to the Semantic Deviation Effect?

High working memory capacity (WMC) is generally predictive of a greater resistance to distraction caused by acoustical deviations. We recently established that a semantic auditory deviation can also capture attention. This study aimed to determine whether these forms of deviation share the same properties by assessing the relationship between WMC and the amplitude of the disruption of serial recall caused by occasional changes in the semantic content of to-be-ignored spoken items. The positive correlation found between WMC and magnitude of the deviation effect suggests that the mechanisms underlying the semantic deviation effect may differ from those underpinning its acoustical counterpart. Keywords: attention; auditory distraction; deviation effect; working memory; semantic processing.

(417*)

Olivia Y.H. Lin (y39lin@uwaterloo.ca), Colin M. MacLeod
University of Waterloo

Semantic Transfer in Colour-Word Contingency Learning

Can people use semantic knowledge of categories to benefit their learning of contingencies? We used the colour-word contingency paradigm to determine whether responding to the colour of a high-contingency word can spill over to the responding to a low contingency word from the same taxonomic category. Word pairs were drawn from three categories and participants either were made aware or were not made aware of the categorical relations. Semantic knowledge affected contingency learning, transferring between word pairs within the same category both when participants were made aware of the categories and also, to some extent, when they were not made aware. Although contingency learning ordinarily is primitive, higher-order relations can be used.

(418)

James Farley (jamesdfarley@gmail.com), Peter Dixon
University of Alberta

Reports of mind wandering are shaped by available information

Mind wandering research relies on self report of one's mental state, yet little is known about how this appraisal is done. Here, we investigated whether reports of mind wandering depend on perceptions of task performance. Participants read a story while simultaneously monitoring for the letter "e" in words. They received accuracy feedback on the letter-detection task that could be better or worse than their actual performance. When subjects received erroneous negative feedback, they were more likely to indicate that they were mind wandering. Our interpretation is that self reports of mind wandering are inferences based on available information.

(419)

Mitchell Reid LaPointe (lapoimrp@mcmaster.ca), Bruce Milliken
McMaster University

Conflicting effects of context in change detection and visual search: A dual process account

Congruent contexts often facilitate performance in visual search and categorization tasks using natural scenes. A congruent context is thought to contain predictive information about the types of objects likely to be encountered, as well as their location. However, in change detection tasks, changes embedded in congruent contexts often impair performance relative to incongruent contexts. Using a stimulus set controlled for object salience, we compare performance in change detection and visual search. The results support a dual process account with opposing influences of context congruency on detection and identification processes, which contribute differentially to performance in visual search and change detection.

(420)

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Queen's University

Comparison of Perceptual and Working Memory Distractors on a Search Task

An emerging framework suggests that working memory (WM) and attention operate over identical representational resources (e.g., Kiyonaga and Egner, 2014). We tested this assumption using two flanker interference paradigms. Participants completed a standard perceptual task and a WM version to determine whether WM content elicited similar interference as visually attended stimuli. Critically, across manipulations of both display and cue set size identification of a target was significantly slower when an incongruent distractor was present at an irrelevant location (either spatially or in memory). These experiments support a unified conceptualization of WM and attention.

(421)

Biljana Stevanovski (bstevano@unb.ca), Zachariah Coakley
University of New Brunswick

Does distractor devaluation generalize to sound?

Distractor devaluation (DD) is the finding that previously ignored stimuli are rated lower affectively as compared to previously attended stimuli (Raymond, Fenske, & Tavassoli, 2003). It is unclear whether the effect is a general property of our system, as most DD research used visual stimuli. Using a dichotic listening task, we examined whether the effect generalizes to sound. Participants simultaneously heard a low- tone and a high-pitched tone and reported the ear to which a pre-defined target was presented. Next, participants rated the "cheeriness" of the target or the distractor tone. Results are discussed with respect to theories of the DD effect.

(422)

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Ryerson University

Differing effects of sensory degradation on cross-modal auditory and visual distractor processing

Research suggests that vision dominates in cross-modal object recognition, however this dominance can be eliminated by degrading the visual information. We investigated whether the effect of visual distractors on auditory object recognition would also be modulated by auditory degradation. We replicated findings of visual dominance under intact conditions, and the elimination of this dominance under degraded conditions. We extend these findings by showing while visual facilitation of auditory processing increases during degraded auditory conditions, visual interference is equivalent during both intact and degraded auditory conditions. Results are discussed with respect to the differential impact of data limits on auditory and visual facilitation and interference effects.

(**423: WITHDRAWN**)

(**424**)

Melissa E Meade (mmeade@uwaterloo.ca), Myra A Fernandes
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Drawing at encoding: Enhanced memory benefits in older adults.

Previous work suggests that drawing to-be-remembered information boosts memory relative to other encoding strategies. Here we aimed to determine whether drawing would similarly benefit memory in older adults. Participants encoded words by drawing, writing them out (Experiment 1), or deeply processing them (Experiment 2) by listing descriptive characteristics for each. Proportion recall for words that had been drawn relative to written was significantly higher in older than younger adults. Older also recalled significantly more drawn than deeply processed words. Results suggest that drawing is a particularly beneficial encoding strategy for older adults, enhancing memory more than traditional recommended memory strategies.

(**425**)

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Cognitive Rules to Multiple Cue Probability Learning

We frequently face decision tasks (such as predicting a professor's salary) that require us to make probabilistic predictions based on a number of cues (such as the number of previous publications and scholarships). Ideally, with feedbacks from repeated exposure to similar tasks, we learn to make multiple cue probability predictions correctly. The present simulation investigated how three common cognitive rules (predicting randomly, using memory for a single cue, and using memory for five or ten cues) aid multiple cue probability learning (MCPL). Results showed agents made more correct predictions if they utilized their memory for the combinations of previously encountered cue-sets and true outcomes, versus if they predicted randomly. Interestingly, utilizing the memory for all previously encountered cues only slightly increased the number of correct predictions than did utilizing the memory for a single cue. The results were consistent even when different environmental rules governed criterion outcomes. Implications for cognitive rules to make probabilistic predictions are discussed.

(**426**)

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Cue contamination: Prospective memory cues disrupt retrospective memory retrieval processes

Prospective memory (ProM) is the cognitive function required for carrying out a planned task in the future. Most ProM tasks are self-initiated and contextually embedded in another task. Previous research suggests that responding to a ProM cue disrupts encoding of surrounding stimuli when the ProM task is embedded in the

study phase of a recognition memory test. To determine if this effect is limited to a disruption at encoding, the present research embeds a ProM task within the retrieval phase of a standard recognition memory test. Results indicate ProM tasks disrupt retrieval processes in a similar pattern.

(**428**)

Natasha Pestonji (natasha.pestonji@psych.ubc.ca), Peter Graf
University of British Columbia

Word Crimes: Word identification difficulty improves memory

The Revelation Effect is the finding that an item/word is rated as more familiar if it was somehow 'revealed' by solving a puzzle. For this study, we implemented a revelation procedure by displaying familiar words obscured by line-grid masks, which varied in density. During encoding, participants rated words on a 6-point liking scale, followed by a brief delay and old/new recognition test of the words. The encoding phase results showed that the liking ratings were negatively correlated with mask density. By contrast, the recognition memory test hit rate showed the opposite pattern – a positive correlation with encoding phase mask density.

(**429**)

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Modelling word-specific false recognition rates in the DRM test

Hintzman's (1988) MINERVA 2 model predicts false recognition in the DRM test (Arndt & Hirshman, 1998). However, the model represents words as random rather than semantically structured events (Johns & Jones, 2010). We resolve the problem by constructing word-specific representations. First, we back-engineered vectors using empirical measurements of intra-list relationships. Second, semantic representations were front-engineered from text databases to capture both intra- and inter-list relationships. The adapted model predicts word-specific false recognition rates. The demonstration strengthens claims that DRM false recognition can be understood as a corollary of episodic storage and resonance-based retrieval (Johns, Jones, & Mewhort, 2012).

(**430**)

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McGill University[1], *York University*[2]

Event generation following medial temporal lobe damage: Using unbiased ratings to assess the quality of the remembered events.

Previous reports have documented autobiographical memory (AM) impairment following medial temporal lobe (MTL) damage by counting the number of specific details used when remembering events. Although these studies make clear that the MTL is important for generating event details, it is less clear how the MTL contributes to what events are remembered. We extracted event titles (e.g., 'dinner with mom') from the memories of individuals with MTL damage and controls. Mechanical Turk raters assessed these titles across a series of dimensions (e.g., frequency, significance). We compared the ratings that were associated with memories generated by the individuals with MTL damage and controls. We also examined the relationship between the ratings and the number of event details. These findings are discussed in terms of models of memory retrieval and assessments of AM.

(**431**)

Signy Sheldon (signy.sheldon@mcgill.ca)
McGill University

Individual differences in memory

Individuals differ in how they remember the past. Some people remember events accompanied with rich visual images whereas others remember the same event without recalling vivid details. I will discuss a study that used an imagery inference technique and a recognition memory experiment to show that imagery ability mediates the

contribution of imagery processes to remembering. I will also discuss a recent fMRI investigation that found that self-reported differences in the way one remembers the past related to predictable resting-state connectivity patterns of the medial temporal lobe (MTL) memory system. These studies advocate for the inclusion of individual differences in the study of the processes of memory.

(**432**)

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Université de Moncton

Intrinsic, but not extrinsic motor characteristics influence object retention

In line with the embodied cognition framework (Glenberg, 1997), some researchers showed that the motor system that allows individuals to physically interact with their environment was recruited in object memory (Lagacé & Guérard, 2014). To further investigate the motor features that modulate object retention, participants were required to retain series of objects in their presentation order. The compatibility between the action performed by participants and the intrinsic (actions necessary to grasp or use the objects) and extrinsic motor features (handle orientation) of the objects to retain were manipulated. Only the compatibility of the objects' intrinsic features modulated memory performance.

(**433**)

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Université de Moncton

The role of language production in the Hebb repetition effect

The Hebb repetition effect (Hebb, 1961) occurs when recall performance improves for a list that is repeated during a serial recall task. This effect is a good experimental analogue to language learning. Our objective was to evaluate the role of language production in language learning using the Hebb repetition paradigm. In each trial, seven auditorily presented phonemes had to be orally recalled either in their presentation order or in reverse order. One sequence was repeated every third trial. Learning rate was not affected when recall direction varied between trials, suggesting a limited role of language production in language learning.

(**434***)

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The Global Precedence Effect in Recognition Memory for Scenes

We examined if memory is determined by global or local processing. Scenes were presented at short and long durations. In Experiment 1A half of the list of scenes was presented for 1 s, whereas the other half was presented for 4 s. Lower performance was shown for shorter presentation time in the exemplar test condition. In Experiment 1B, similar performance was shown in an exemplar test for which the lure was of a different studied category. In Experiment 2, with presentation time lowered to 500 ms, recognition accuracy reduced. Processing and remembering of scenes follows Navon's (1977) Global Precedence Hypothesis.

(435)

Matthew Alexander Kelly (matthew.kelly2@carleton.ca), Kam Kwok, Robert L West
Carleton University

Holographic declarative memory and the fan effect: A test case for a new memory module for ACT-R

We present Holographic Declarative Memory (HDM), a module for ACT-R and alternative to ACT-R's Declarative Memory (DM). ACT-R is a widely used cognitive architecture that models diverse aspects of cognition, but is limited by its use of symbols to represent concepts and stimuli. HDM replaces DM's symbols with holographic vectors, enhancing ACT-R's ability to learn associations, learn over the long-term, and store knowledge. We fit performance of an ACT-R model that uses HDM to a benchmark memory task, the fan effect, analyze how HDM produces the fan effect, and contrast with the DM model.

(436)

Hanae Davis [1] (davishc@mcmaster.ca), Tamara Rosner [2], Zahra Khalesi [1], Bruce Milliken [1]
McMaster University[1], *University of Waterloo*[2]

Desirable difficulty: The benefit of perceptual disfluency on remembering

Memory performance is often better when encoding is difficult rather than easy, a regularity in remembering captured by the "desirable difficulty" principle (Bjork, 1994). In line with this general principle, two recent studies demonstrated that recognition memory was better for incongruent than for congruent selective attention items (Rosner, D'Angelo, MacLellan & Milliken, 2014), and better for blurry than clear words (Rosner, Davis & Milliken, under review). The present study examined the contribution of trial-to-trial context influences on these two effects, and discusses the possible role of attentional adaptation on encoding processes in such effects.

(437)

Natalie Anne Lockyer (nlock101@uottawa.ca), Christine Sheppard, Vanessa Taler
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Semantic Memory for Biological and Artifact Items in Mild Cognitive Impairment.

Mild Cognitive Impairment (MCI) is associated with declines in semantic abilities. These declines may be greater in males than in females. Two picture-naming tasks were administered to monolingual English-speaking MCI patients (n=16) and healthy older adults (OA, n=60). 49 biological and 49 artifact items, matched for ranked difficulty across item categories, were chosen. The OAs outperformed MCI patients across categories. MCI patients did not differ in performance on biological vs artifact items. These results suggest a global semantic decline in MCI, which impacts both categories equally. Furthermore, female MCI patients outperformed males on food items, indicating a protective cohort effect.

(438)

Kenichi Kato (kkato1@ualberta.ca), Jeremy B. Caplan
University of Alberta

Is the constituent order fundamental or additional to the association memory?

The studies of episodic memory for associations revealed associative symmetry. However, whether order within associations may be stored as a part of the association memory or as additional information has been in question. We tested whether attending order within association during study phase affects later in the recall performance. The results showed: both the Order-attending and control groups performed equally well in the cued recall; and the Order-attending group did not perform significantly better in order recognition than control. This suggests that within-pair order is learned in some degree, but not a great deal, and may not be substantially improved.

(439)

André Morin [1] (andre_morin27@hotmail.com), Giovanna Mioni [2], Simon Grondin [1]
Laval University[1], *University of Padova*[2]

The influence of time monitoring and cognitive load on time-based prospective memory

We examined the role of cognitive load, monitoring condition and executive functions on the performance to a time-based prospective memory (TBPM) task. Eighteen subjects completed various tasks, assessing executive functions (updating and inhibition) as well as performance to a TBPM task under two different cognitive load conditions (high and low). Subjects completed the study in either a fixed or free time monitoring condition. The results show that limiting the time monitoring availability does not seem to have a significant effect on TBMP performance. However, a higher cognitive load has a negative effect on strategic time monitoring behavior.

(440)

Abdo Elnakouri (hdrou009@uottawa.ca), Kerri Adams, Héloïse Drouin, Patrick Davidson
University of Ottawa

Any Effects of Cognitive Priming on Object-Location Memory are Smaller than Originally Reported

A few recent reports have suggested potential benefits of holistic as compared to analytical priming on object-location memory (Kuhnen & Oyserman, 2002; Oyserman, Sorensen, Reber & Chen, 2009). We made four attempts to replicate this effect. Despite having sufficient statistical power, using nearly (Experiment 1, n=145) and then exactly (Experiment 4, n=100) the same methods as the original experiments, and attempting to increase the priming "dosage" (Experiments 2, n=90, and 3, n=100), we found no consistent effects of priming on memory. Any effects of cognitive priming on object-location memory appear to be smaller and/or less consistent than initially reported.

(441: WITHDRAWN)

(442)

Robert Collins (collinrn@mcmaster.ca), Annie Mills, Tamara Rosner, Bruce Milliken
McMaster University

The Complex Interplay of Encoding Demands, Repetition, and Recognition

Rosner, López-Benítez, and Milliken (2014, BBCS) reported that recognition memory can be more sensitive for study items presented once (not-repeated) than for study items presented twice (repeated). We examined this ironic effect further by varying encoding demands. Participants completed an incidental study phase involving presentations of a prime and target word, and encoded the prime under varying conditions: (1) Ignoring; (2) Divided Attention; (3) Count the Vowels; (4) Naming; and (5) Semantic Categorization. Across these conditions, performance varied from better recognition for not-repeated items to better recognition for repeated items, implying a complex interplay between encoding demands, repetition, and recognition.

(443)

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Mount Royal University

A Systematic Review: Reliabilities of Prospective Memory Measures

Previous research has raised concerns about low reliabilities of various prospective memory (ProM) measures. We conducted a systematic review of reliabilities ProM measures reported in previously published studies. Our results showed that (1) reliability of ProM measures was rarely reported, (2) reliability of subjective measures of ProM (e.g., PRMQ and PMQ questionnaires) was relatively high, and (3) reliability of objective measures of ProM varied by ProM subdomain with vigilance/monitoring measures having moderate to high reliabilities and episodic ProM measures having poor reliabilities.

(444*)

Jeffrey D Wammes (jwammes@uwaterloo.ca), Melissa E Meade, Myra A Fernandes
University of Waterloo

The drawing effect: Evidence for reliable and robust memorial benefits.

In an exploration of the 'drawing effect', we instructed participants to draw to-be-remembered words during encoding. Across multiple experiments, we directly contrasted the memorial benefit conferred by drawing with other pertinent encoding strategies. Drawing enhanced memory more than encoding through writing, elaboration, imagery, and pictorial presentation. Further, in an exploration of potential limitations of this benefit, we showed that drawing boosts memory following both long and short encoding durations, and after both mixed and pure presentation of encoding manipulations. Findings show that drawing is a consistently effective subject-performed task, and uniquely enhances memory over and above other known encoding strategies.

(445)

Bob Uttl (uttlbob@gmail.com), Cassidy Wilson
Mount Royal University

A systematic review: Prospective memory and nicotine

We conducted a systematic review of relationships between nicotine use and prospective memory performance. For this purpose, we searched for and coded all previous studies investigating relationships between both acute and chronic nicotine use and both subjective and objective prospective memory measures. The results showed that the strength of the relationship between nicotine use and prospective memory measures varies by type of use (acute vs. chronic), prospective memory subdomain (e.g., vigilance/monitoring vs. episodic prospective memory), and other factors.

(446)

Yabo Hui [1] (xiaodai308@163.com), Chen Song [1], Bishoy Ragheb [2], Chao Wang [1], Guang Zhao [3], Xuejun Bai [1], Hong-jin Sun [2]
Tianjin Normal University[1] , *McMaster University*[2], *Liaoning Normal University*[3]

Learning multiple target-context relations in a modified contextual cueing paradigm

Subjects search faster for repeated scenes than novel ones (contextual cueing effect, Chun and Jiang, 1998). Recent research has shown that, following an initial learning phase, when the target locations were exchanged between two different repeated scenes, the contextual cueing effect was largely maintained (Zellin et al., 2013). In the current study, across blocks, a given target was paired with different repeated contexts and a given repeated context was paired with different targets. Contextual learning still occurred in this condition suggesting contextual cueing effect could be generated without a fixed one-to-one relation between target location and context.

(447)

Chen Song [1] (Psysongchen@126.com), Yabo Hui [1], Chao Wang [1], Guang Zhao [2], Xuejun Bai [1], Hong-Jin Sun [3]
Tianjin Normal University[1], *Liaoning Normal University*[2], *McMaster University*[3]

The Contribution of Response Selection in the Contextual Cueing Effect

Subjects search faster for repeated scenes than novel ones (contextual cueing effect, Chun and Jiang, 1998). We demonstrated that the RT benefit could be attributed to attentional guidance and response selection (Zhao, et al, 2012). We recently found that contextual cueing could even occur when, across blocks, a given target location was paired with different repeated contexts and a given repeated context was paired with different target locations. In the current study, we found a benefit in the intercept for the function of RT and set size, suggesting that response selection could be a major contributing factor in contextual learning.

(448)

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Mount Saint Vincent University

Why remember now what I can remember later? Effects of reviewing photos on memory

Recent research has reported a photo-taking impairment effect (PTIE)—the finding that taking photos of objects results in poorer memory accuracy than simply observing objects. Though there is currently no evidence to explain why this effect occurs, directed forgetting (DF) has been suggested as a possible explanation. In order to test this, participants observed or photographed 28 target objects sequentially, and had their memory tested for these objects a day later. The DF hypothesis was tested by manipulating the review instructions given to participants. Results are discussed in terms of whether the PTIE can be explained by a DF effect.

(449)

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Tianjin Normal University[1] , *McMaster University*[2]

Probability Cuing in Visual Search: an Investigation in Simulation of Real World Scene

In a visual search task participants search faster when the target appears in a region with high probability compared to low-probability regions. We examined the spatial frame of reference in this type of learning using computer rendered illustrations of 3D scenes. The target location probability was different across four quadrants during training but the same during testing. Participants learned the layout from one or two views and, before testing, moved to a different view. The results suggest that, for most participants, the attended locations are viewer-centered without update with viewer movement but small percentage of participants could update.

(450)

Aaron P. Johnson [1] (aaron.johnson@concordia.ca), John O. Brand [2], Onur Bodur [1], Bianca Grohmann [1]
Concordia University[1], *Cornell University*[2]

Brand knowledge increases search efficiency during hybrid visual search.

Hybrid search involves looking within a display for items held in memory. But what if you had prior knowledge of the item? E.g., searching for a popular brand of cola may be faster, as the participant knows that the target is red and white. Thus, prior knowledge may improve search efficiency. We ran a hybrid search for known versus unknown brands, manipulating memory and visual set size. We observed set-size effects for items memorized and number of items; but reaction times increasing across both set sizes for the unknown (versus known) objects. Thus, prior knowledge increases efficiency in hybrid search.

(451)

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Simon Fraser University

Does T1 difficulty modulate AB magnitude? It depends on how you measure it

Perception of the second of two rapidly sequential targets (T1, T2) is impaired when presented soon after the first (attentional blink; AB). AB magnitude is conventionally indexed by the difference in T2 accuracy between short and long inter-target lags. An inherent problem with this measure is the 100% response ceiling. For example, Visser (2007) reported larger ABs with hard than with easy T1 tasks. We question that conclusion because the functions converged to the ceiling, thereby confounding T1 difficulty with ceiling constraints. We avoided this problem by using reaction time, and found AB magnitude to be invariant with T1 difficulty.

(452)

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University of Waterloo

Thinking in the shadow of the Internet: Effects on metacognitive control

Recent technological advances have given rise to an information-gathering tool unparalleled by any in human history – the Internet. While access to the Internet is largely ubiquitous, relatively little research exists on its relation to how we think. In the present investigation we examine the impact of access to the Internet on (1) the decision to volunteer information, and (2) feeling-of-knowing (FOK). Critically, access to the Internet influenced the former but not the latter. These findings suggest that access to the Internet may be shifting the criterion used to determine when to volunteer versus withhold information.

(453)

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Carleton University

Psychology Students Don't Think Science When They Think Psychology

Research suggests that psychology is typically perceived to be less scientific than the other sciences (Lilienfeld, 2010). Yet, the cognitive mechanisms responsible for this phenomenon remain unclear. A plausible explanation is that natural sciences (e.g., biology, chemistry and physics) are highly associated with the concept science while psychology is not. The goal of this thesis was to explore this possibility. One hundred and fifty-nine undergraduate students were recruited. They were asked to complete a discrete free association task (Nelson et al., 2004) for a variety of scientific and non-scientific academic disciplines as well as the words psychology and science. The results demonstrated that psychology does induce word associates that exemplify the scientific method, but it did not lead participants to perceive psychology as a science. The results may reveal participants' misconception that science is defined by its object of study rather than its methodology.

Colloquium Session 1

Sunday June 7, 2015 (12:50 – 2:05 p.m.)
Carleton University

Cognition I

University Centre 180
12:50 – 2:05 p.m.

(500*)
David De Vito (ddevito@uoguelph.ca), Mark J. Fenske
University of Guelph

Inhibitory devaluation of distractors that match the contents of visual working memory

Selective attention can be biased toward stimuli matching the contents of visual working memory, yet recent electrophysiological evidence suggests that such items become actively suppressed when task irrelevant. Attentional inhibition routinely leads to stimulus devaluation. Therefore, if memory-matching distractors are indeed inhibited, then subsequent affective ratings of such items should be more negative than novel items or non-memory-matching distractors. To test this, we combined a delayed match-to-sample task with an affective evaluation task. Results revealed significant affective devaluation of memory-matching distractors, suggesting that inhibition of such items may be required to prevent interference with the contents of working memory.

(501*)
Brandon J. Slaney (brandonslaney@live.ca), Kathleen L Hourihan
Memorial University of Newfoundland

The Production Effect and Divided Attention: Is Purposeful Attention Required?

The production effect may occur due to the enhanced distinctiveness of produced items, relative to items read silently. The current research used divided attention (at encoding and retrieval) to investigate the role of attentional resources in obtaining the production effect (on both recognition and free recall tests). Results showed that a production effect occurred under all conditions except when attention was divided during free recall tests. These results support the idea that the distinctive information associated with produced words is encoded relatively automatically, but it may not be accessible at test when retrieval occurs under attentionally demanding conditions.

(502)
Brett Cochrane (brett.a.cochrane@gmail.com)
McMaster University

The impact of explicit strategy on pop-out search: Using imagination to reverse repetition effects

This study explored the influence of explicit strategies on repetition effects in colour pop-out search. In a seminal study, Malkjovic and Nakayama (1994) found that target colour repetition effects were unaffected by explicit verbal predictions of the upcoming target colour. In the present study, we instructed participants to imagine the opposite target colour in between trials under conditions where "switch" trials were more likely than "repeat" trials. Participants responded faster to "switch" targets than to "repeat" targets, reversing the usual repetition effect. The results suggest that repetition effects in pop-out search are sensitive to some forms of explicit strategy.

(503)
Timothy L Dunn (timothy.l.dunn1@gmail.com), Evan F Risko
University of Waterloo

Avoiding Perceived Cognitive Effort

The idea that humans organize their behavior in

order to avoid effort is ubiquitous, although a consensus about what effort actually entails is lacking. The current study contrasted the contributions of perceived effort with effort as determined by performance-based measures (i.e., RTs and errors) to effort avoidance behavior. Individuals completed a demand selection task in which they were free to choose different types of arrays to read on every trial. Results demonstrated that the best predictor of demand selection was perceived effort. Thus, cognitive effort avoidance seems to be based on effort beyond that indexed by performance measures.

(**504**)

Geoffrey William Harrison [1] (8gh3@queensu.ca), Jason Rajsic [2], Daryl Edward Wilson [1]
Queen's University[1], *University of Toronto*[2]

Quantifying qualitative aspects of consciousness using object-substitution masking

In five experiments, responses from object-substitution masking (OSM) paradigms were collected on a continuous scale (0-360 degrees) and submitted to a mixture modeling analysis (Zhang & Luck, 2008). This procedure provides separable estimates of the proportion of trials in which a target fails to reach conscious awareness and the precision of the target representations that do reach awareness. In experiments 1-2, two distinct paradigms revealed that OSM both deletes and degrades object representations. Experiment 3 extended this finding to a second object class. Experiments 4-5 characterized the continuous nature through which OSM degrades object representations within conscious awareness.

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Memory I

University Centre 182
12:50 – 2:05 p.m.

(**505**)

Zeynep Barlas (barl0270@mylaurier.ca), William E. Hockley
Wilfrid Laurier University

Context effects on recognition memory: Manipulating the meaningfulness of the context influences recognition memory

We first examined the memorability of abstract and naturalistic paintings and then investigated the context dependency effect on recognition memory for words by using these paintings as background contexts. The encoding of contexts was also manipulated as either incidental or intentional. We found that although the recognition accuracy for abstract and naturalistic paintings were indifferent, hit rates were higher with naturalistic than abstract paintings when presented as contexts. Moreover, hit rates for old contexts were higher compared to novel contexts. Finally, intentional encoding led to higher hit rates and greater discrimination for matching-old contexts compared to rearranged-old contexts.

(**506**)

Douglas Mewhort (mewhortd@queensu.ca), Elizabeth Johns
Queen's University

How we make forced-choice decisions: a challenge to signal-detection theory

In signal-detection models of forced-choice decision, subjects choose the most familiar of the test alternatives. Using a variance argument, the model explains why test alternatives derived from one studied item (A-A') typically enjoy better accuracy than those derived from different studied items (A-B'). In episodic recognition for mixed plurality nouns, the advantage reversed. We argue that the A-A' advantage vanished because pertinent details of the stimuli were identified in both conditions and that the A-B' advantage occurred because either endorsing a target or rejecting a lure supported a decision. Our two-factor approach predicted comparable results in a semantic-memory experiment.

(507*)

Yu Du [1] (du5@ualberta.ca), Neil McMillan [1], Christopher R. Madan [2], Marcia L. Spetch [1]
University of Alberta[1], *Boston College*[2]

Weighted integration of landmarks in a one-dimensional spatial search task

Participants searched for a hidden goal along a one-dimensional line between two distinct landmarks on a computer screen. On baseline trials, the landmarks always appeared in the same locations relative to the goal, with one landmark always closer to the goal. On probe trials, both the landmarks were shifted farther away from the previous-learned goal location. When trained with both single landmarks and two landmarks, participants' search locations shifted part-way toward the nearer landmark, suggesting a Bayesian-weighted integration of the two landmarks. When trained only with single landmark, participants treated each landmark as a Bayesian-weighted, independent source.

(508)

Ralph S. Redden (rredden@dal.ca), Matthew D. Hilchey, Raymond M. Klein
Dalhousie University

Dissociating performance dynamics in the aftermath of an uninformative cue: Input or Output effect?

Inhibition of return (IOR) is considered an inhibitory aftermath of visuospatial orienting, expressed in the form of slower responding toward the locations of prior orienting responses. As shown by Taylor and Klein (2000), the form of IOR depends on the saccadic response demands imposed by the task and, hypothetically, whether the oculomotor response system for reflexively generated saccades is in an active state. To test this hypothesis, we evaluate IOR by requiring a manual discrimination response preceded by reflexive and non-reflexive eye movements in separate conditions. The findings suggest that the state of the oculomotor system determines the form of IOR.

(509)

Samuel Hannah (hannah.sam@gmail.com), Taylor Summach
University of Saskatchewan

Feedback and criterion shifting in a sequence effect study

A model of recognition memory with a trial-by-trial criterion shift successfully predicted the emergence of sequence effects in a structured word-frequency recognition test. We modify the model to account for feedback, and tested its prediction that low levels of feedback would amplify word frequency effects. We replicated the basic sequence effect, and show that the responsiveness of the criterion shifting does indeed change over lists, but as a function of list order, not feedback level.

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Neuroscience I

River Building 2200
12:50 – 2:05 p.m.

(510)

Vanessa Taler[1], Brendan Johns[2] (bjohns11@gmail.com), Christine Sheppard[3], Michael Jones[4]
University of Ottawa[1], *Queen's University*[2], *University of Waterloo*[3], *Indiana University*[4]

Determining the Linguistic Information Sources Underlying Verbal Fluency Performance across Aging and Cognitive Impairment

Verbal fluency measures are widely used in both clinical and theoretical examinations of memory. We attempt to delineate the cognitive variables that underlies performance in this task through the use of a formal model. Data were collected across three different participant groups: young subjects, older adults, and patients with mild cognitive impairment. The model uses a set of lexical information sources, and differences in the use of these variables was assessed with a standard memory model, embedded in a model testing framework. The results shed light on the

changes that occur in memory search across aging and cognitive impairment.

(511)

Ramy Kirollos [1] (ramykirollos@cmail.carleton.ca), Robert Allison [2], Stephen Palmisano [3]
Carleton University[1], *York University*[2], *University of Wollongong*[3]

The Neural Correlates of Vection - an fMRI study

Vection is an illusion of visually-induced self-motion in a stationary observer. This functional magnetic resonance imaging (fMRI) study measured psychophysical and blood oxygenation level-dependent (BOLD) responses to two types of visual stimuli: coherent optic flow stimuli and scrambled versions which preserved local, but disrupted global, motion information. The coherent optic flow stimuli produced robust percepts of vection while the scrambled stimuli produced little or no vection. The cingulate sulcus visual area (CSv) showed the clearest selective activation for coherent optic flow compared to incoherent (scrambled) flow suggesting that CSv is heavily involved in self-motion processing.

(512)

Thomas Thiery (tbthiery91@gmail.com), Martin Arguin, Pierre Jolicoeur
University of Montreal

ERPs reliably track visuo-spatial attention

Decoding brain activity to predict the perceptual experience of participants is a relatively new approach that opens a range of new possibilities to determine how neural activity represents the task or stimulus information (Serences & Saproo, 2012). The approach involves first to record brain activity while participants perform a particular task or are exposed to stimuli. A decoder then learns the correspondence between brain activity and task/stimuli to then 'predict' the latter based on the former. For instance, in vision, it has been used successfully for the study of object and face perception (Haxby et al., 2001), color vision (Brouwer & Heeger, 2009), and orientation processing (Freeman et al., 2011). In the present study, we ask whether a decoding approach can be used to track visuo-spatial attention in neurologically intact observers based on brain activity recorded by event-related potentials (ERPs).

(513)

Travis Edward Baker (travis.e.baker.phd@gmail.com), Alan Tucholka, Stephane Potvin, Paul Lesperance, Didier Jutras-Aswad, Kevin Larcher, Patricia Conrod
University of Montreal

Optimizing combined fMRI-DTI-TMS-ERP methods to identify and regulate reward valuation during nicotine craving

A novel multimodal neuroimaging strategy was used to identify and reverse the valuation bias observed between monetary and drug-related rewards in individuals who smoke. fMRI and DTI characterized structural and functional components associated with reward valuation. During Sham/TMS (+EEG) sessions, participants engaged in two T-maze tasks, either feedback indicated win/lose money or win/lose puffs on a cigarette. A robotic arm positioned the TMS coil over left dorsal lateral prefrontal cortex based on individual fMRI data. As predicted, 10hz TMS enhanced the neural response to money rewards, and 1hz TMS reduced the valuation to cigarettes rewards.

(514)

Christine Lefebvre (christine.lefebvre@umontreal.ca), Pierre Jolicoeur
Université de Montréal

The SAN indexes memory for sound objects rather than pitch contour

The sustained anterior negativity (SAN) is an electrophysiological index of maintenance in auditory STM (ASTM). Our goal was to verify if the SAN indexes individual sounds, or the contour created by pitch transitions between sequential tones. Participants memorized tones interspersed with irrelevant white noise bursts.

This was compared to a control condition in which only white noise bursts were presented. ERPs show a load modulation correlated with individual performances, as well as a sharp return to zero of activation in the control condition, confirming the SAN is an index of the maintenance of sound objects in ASTM.

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Cognition and Applications I

River Building 1200
12:50 – 2:05 p.m.

(515)

Jason Ivanoff [1] (J.Ivanoff@smu.ca), Nicole Webb [2], Kabilan Thanapaalasingham [3], Benjamin Rusak [3]
Saint Mary's University[1], *McGill University*[2], *Dalhousie University*[3]

Forty winks lessen the blink.

There are severe constraints on the number of items we can attend to simultaneously. The attentional blink (AB) refers to the relative inability to process a new target (T2) while processing an old target (T1). Sleep deprivation is thought to limit our ability to effectively process information. We investigated the effects of sleep deprivation on the AB. The AB was prolonged following partial sleep deprivation compared to the AB following a full night's sleep. These results suggest that sleep deprivation reduces the ability to process information and efficiently switch attention from one item to the next.

(516)

Kyle Richard Morrissey [1] (krm031@mun.ca), Mowei Liu [2], Jingmei Kang [3], Darcy Hallett [1], Qiangqiang Wang [3]
Memorial University of Newfoundland[1], *Trent University*[2], *Northeast Normal University*[3]

Embodied numerosity in Chinese and Canadian University students

This project looked at the impacts of finger counting habits on adult students' number magnitude processing. Around 140 Canadians from Trent and Memorial University took part, with an additional 123 university students from Northeast Normal University, Changchun, China. Strong sub-base 5 effects indicated that Canadian participants shoulder an additional cognitive load, in the form of a longer than predicted response latency, when comparing numbers that would have required more than one hand to represent. Chinese students typically count on only one hand and so show no response delay. Task performance appears to be partially modulated by within-culture differences in finger counting habits. Most differences occur when comparisons between pairs of numbers cross 5, 10, and 15. Participants' self-reported finger counting habits seem to be influenced by task demands as well, which complicates the relationship between individual differences in finger counting habits and number magnitude processing.

(517)

Irene Reppa (i.reppa@swansea.ac.uk)
Swansea University

Informational affordances: evidence of acquired perception–action sequences for information extraction

Visual objects can automatically prime actions allowing efficient interaction with them. The present study examined whether object perception can automatically prime actions leading to efficient information extraction. Participants in Experiment 1 learned to rotate a cube in a specific way with the end goal of efficiently revealing object-identifying information. In Experiments 2 and 3, the end goal of obtaining object-identifying information was removed, but the stimulus–response associations were pre- served. Only object views associated with actions learned in the context of obtaining identifying information caused response interference and benefits in a subsequent test phase where the object was irrelevant. These results demonstrate the existence of informational affordances: perception–action sequences acquired with the

goal of information extraction that are automatically primed during exposure to the object.

(**518**)

Chris Nicholson (chrisnicholson@cmail.carleton.ca), Ramy Kirollos, Jon Wade, Chris Herdman
Carleton University

The Impact of Disturbance Motion on Visual Spatial Working Memory

Three experiments examined the ability to remember either the location or the appearance of visual stimuli in the presence of directional (left/right) motion cues provided by a motion seat. Cues occurred during stimulus encoding or rehearsal. Memory for stimulus location—but not for appearance—was significantly impaired when participants were required to respond to motion cues presented during encoding or rehearsal. However, removing the requirement to respond to the motion cues nulled this effect. An experiment with delayed motion cue responses examined whether this null effect was caused by reducing working memory load or by eliminating potential motor response conflicts.

(**519**)

Ben Townsend (townsepb@mcmaster.ca), Shannon O'Malley, Joey Legere, Martin von Mohrenschildt, Judith M. Shedden
McMaster University

Electrophysiological correlates of visual-vestibular integration

The integration of the visual and vestibular systems is critical to the perception of self-motion. This series of experiments examined visual and vestibular integration using electrophysiological measures. Participants performed motion discrimination tasks in a virtual environment in a motion-based simulator, in which we presented multisensory motion cues and recorded from a high-density 128 channel EEG array. The tasks required participants to report direction of perceived headings that were presented with visual and/or physical motion stimuli. We manipulated the timing and congruency of motion stimuli to determine neural markers of successful and failed visual-vestibular integration.

Colloquium Session 2
Sunday June 7, 2015 (2:15 – 3:15 p.m.)
Carleton University

Developmental
River Building 2200
2:15 – 3:15 p.m.

(520*)

Jordynne Lydia Victoria Ropat [1] (jlvropat@gmail.com), Annika Linke [1], Conor Wild [1], Charlotte Herzmann [1], Leire Zubiaurre-Elorza [1], Hester Duffy [1], David Lee [2], Victor Han [2], Rhodri Cusack [1]
Western University [1], *Children's Health Research Institute (London, Ontario)* [2]

The Emergence of the Motor Network in the First Year

The developing motor network was characterized using neuroimaging. The nodes of the adult motor network were identified using meta-analysis. Functional MRI was collected in adults and infants at 3 and 9 months corrected age. Functional connectivity between nine brain regions was found to be surprisingly similar between infants and adults, suggesting early maturation of the network. Strong inter-hemispheric correlations were observed between the left and right thalami, cerebella, and precentral gyri in all groups. Subtle thalamus-network age differences will be explored in future research. Networks could be reliably identified in individuals, suggesting clinical potential for the detection of abnormal development.

(521)

Anne Lafay (anne.lafay.1@ulaval.ca), Marie-Catherine St-Pierre, Joël Macoir
Université Laval

Non-symbolic number processing in developmental dyscalculia: impairment of production but not comprehension

We investigated the functional origin of developmental dyscalculia (DD) in 24 French-Quebec 8-9-year-old children. Their performance in tasks designed to assess non-symbolic number processing was compared to that of 37 typically developing children (TC). Results showed that DD were as successful as TC in number comprehension tasks. Their performance in an analogical-to-analogical number production task was also similar to that of TC for small (1-4) and large (10-99) numerosities, while they were less successful than TC in transcoding medium (5-9) numerosities. These results suggest that DD is not caused by a "number sense" deficit, but from a specific production deficit of some types of analogical numbers.

(522)

Cheryll Fitzpatrick, Darcy Hallett (darcy@mun.ca), Nicole Pelley, Kyle Morrissey
Memorial University

Doing what they want instead of what they are taught: Methods of division used by fourth and fifth grade students

While research regarding children's understanding of division often focuses on what children know about division before receiving formal instruction, this study examines the methods used after said instruction. Grade 4 and 5 students were asked to solve 10 computational division problems and a multiplication fact test. Both Grade 4 and 5 children unexpectedly used Inverse Multiplication methods most often, especially methods that were not formally

taught, even though other methods such as Equal Sharing and Equal Grouping were more explicitly taught. Question difficulty and math fact competency elaborate on these results, suggesting children gravitate towards invented methods involving inverse multiplication.

(**523**)

Katherine Andrews (katherine.andrews@carleton.ca), Corrie Vendetti, Kate Carroll, Deepthi Kamawar
Carleton University

Preschoolers' Development of Intent-Based Moral Judgment and the Role of Theory of Mind

Children begin to consider intentions, instead of only outcome, when making moral evaluations of others' actions at approximately five years of age (e.g., Cushman, Sheketoff, Wharton, & Carey, 2013). However, typical paradigms may underestimate children's abilities, since they do not allow them to directly compare characters' intentions. The current study employs a novel paradigm enabling 4- to 5-year-olds to make such comparisons, thereby facilitating paying attention to characters' intentions. Preliminary findings will be reported comparing performance on the novel paradigm to the typical paradigm, to children's False-Belief understanding (Theory of mind), and to working memory performance.

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Cognition II

University Centre 180
2:15 – 3:15 p.m.

(**524**)

Janel Fergusson (janelf@psych.ubc.ca), Peter Graf
University of British Columbia

Time and Time Again: Judgment Accuracy in Production and Reproduction of Time

Timing is required for many common tasks, such as steeping a cup of tea for 4 minutes. For many of these tasks we rely on internal devices rather than clocks. Previous research has suggested that subjects underestimate intervals of 2-6 minutes, but the reason for this underestimation is unclear. One possibility is that subjects do not have sufficient reference memory for longer intervals. In the present study, subjects produced and reproduced intervals from 2-6 minutes. If it is the case that overestimation is the result of poor reference memory, reproductions should be more accurate than productions.

(**525**)

Chrissy M. Chubala [1] (chrissychubala@gmail.com), Brendan T. Johns [2], Randall K. Jamieson [1], D. J. K. Mewhort [2]
University of Manitoba [1], *Queen's University* [2]

Applying an exemplar model to implicit learning of conjunctive rule sets: Structure emerges from encoding representations

Neil and Higham (2012) had participants study words selected according to a conjunctive rule (e.g., rare-concrete and common-abstract). At test, participants reliably selected rule-consistent words in a 2AFC task, but could not verbalize the rule. These findings mirror those in artificial grammar learning (AGL) of non-word letter strings, but evade explanation by traditional AGL models. We simulate the full pattern of results by incorporating vector representations derived from large-scale semantic space models into an exemplar memory model. We show that basic memory processes are sufficient to capture examples of complex implicit learning, provided that realistically structured stimulus representations are encoded.

(**526**)

Javier Ortiz-Tudela (fjavierortiz@correo.ugr.es)
University of Granada

Exploring semantic congruency effects on episodic learning: Evidence from a change detection task.

Recent research points at incongruency as a signal that may trigger learning mechanisms that enhance episodic encoding. At the same time, prior work from our lab with other procedures has revealed the opposite result as well, with better memory for congruent than

incongruent stimuli. Here, we present data from a change detection task showing: i) faster change detection times for targets that are semantically incongruent with context, but better identification for targets that are semantically congruent with context; ii) a congruency-enhanced memory effect specific to target objects; and iii) preliminary analyses of anatomical connectivity between several task-related brain regions.

(**527**)

Craig Leth-Steensen (craig.lethsteensen@carleton.ca), Abeer Mourad
Carleton University

Orthogonality of Imagined Spatial Reference Frames and the SNARC Effect

In this work, participants judged the magnitude of single digits as being smaller or larger than 5. Reponses were made manually using either horizontally or vertically aligned response keys. Before starting the task, different groups were asked to imagine the numbers 1-9 arrayed in either a left-right, down-up, or near-far fashion. Results showed that the presence of the spatial-numerical association of response codes (SNARC) effect depended on whether the imagined number array and the locations of the response keys were spatially aligned. Such findings highlight the role that spatial reference frames play in determining the SNARC effect.

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Memory II

University Centre 182
2:15 – 3:15 p.m.

(**528**)

Evan Thomas Curtis (curtise@cc.umanitoba.ca), Randall K. Jamieson
University of Manitoba

Reinterpreting selective impairments in amnesia

Amnesics show severely impaired memory on some tasks but relatively normal performance on other tasks. The theoretical implications of these dissociations are intensely debated. By one account, they force a distinction between memory systems. By another account, they imply global memory deficits that manifest as selective impairments. We argue against the distinctions account by demonstrating that MINERVA2 (Hintzman, 1986), an exemplar model of memory, accommodates dissociations between classification and recognition. The model's success provides converging evidence with alternative computational frameworks providing an increasingly comprehensive account of memory dissociations without recourse to distinctions between memory systems.

(**529**)

Kathleen L. Hourihan (khourihan@mun.ca), Angela Lundrigan
Memorial University of Newfoundland

Context reinstatement does not influence source memory in item method directed forgetting

This study investigated whether context reinstatement influences source memory in the item method directed forgetting paradigm. Participants studied Remember- and Forget-cued words presented at the top or bottom of the screen. At test, items were either re-presented in the same location context or in the opposite location. Recognition test trials required a source tag response (i.e., Remember, Forget, or New), rather than an old/new response. The standard directed forgetting effect was observed in overall recognition accuracy, but context had no influence on recognition accuracy or the relative proportion of correct source tags for either Remember or Forget words.

(**530**)

Tamara M Rosner (rosnertm@mcmaster.ca), Hanae Davis, Bruce Milliken
McMaster University

An effect of perceptual disfluency on recognition: Blurry may be desirable after all

We present a series of experiments in which presenting words in a blurry rather than clear font at study led to better recognition of those

words at test. This result was obtained across a variety of experimental manipulations, but was eliminated with the introduction of metacognitive judgments at study. The results are discussed in the context of several other potentially related findings in which memory is improved under conditions in which perceptual encoding difficulty is increased.

(531)

D. Stephen Lindsay (slindsay@uvic.ca)
University of Victoria

Materials-based Bias Effects in Old/New Recognition Memory

We report evidence that old/new recognition memory response bias varies with the nature of the stimulus materials. With words, average response bias was neutral. But when the stimuli were scans of little-known paintings, most subjects were conservative in their recognition judgments (i.e., they more often erred by saying "Not Studied" to studied paintings than by saying "Studied" to non-studied paintings). This materials-based bias effect is independent of differences in discrimination. We also found a significant (albeit weaker) tendency toward conservatism in recognition of photos of faces. We describe our efforts to explain materials-based bias effects.

•ψ•

Perception

River Building 1200
2:15 – 3:15 p.m.

(532)

Nichole E Scheerer (nikkischeerer@gmail.com), Jeffery A Jones
Wilfrid Laurier University

The Role of Auditory Feedback for Speech Motor Control in Individuals who Stutter

Stuttering is characterized by disturbances in the coordination and movements of the respiratory, phonatory, and articulatory systems. Delayed, frequency altered, and masked auditory feedback (AF) influence stuttering severity. However, it is currently unclear how these AF manipulations affect speech motor control in individuals who stutter (IWS). To investigate the role of AF for online speech motor control, as well as speech motor planning, IWS and healthy controls were exposed to persistent changes in the pitch of their AF. The results of this study may aid in the understanding of how speech motor control is regulated by AF in IWS.

(533)

Hussein Assi [1] (hussein.assi@umontreal.ca), Christophe Alarie [1], Robert Davis Moore [1], Sylvie Hébert [1], Christine Turgeon [2], Dave Ellemberg [1]
University of Montreal[1], *Université du Québec à Montréal*[2]

Audiological hypersensitivity in the post-acute phase of sport-related concussions

This study evaluated auditory noise sensitivity in collegiate athletes (15 concussed, 7 controls). All participants had normal hearing and concussed athletes were 2-8.5 weeks from injury. Participants completed noise sensitivity and psycho-affective questionnaires followed by an audiological assessment of hearing threshold and sound intolerance. Concussed athletes reporting noise sensitivity had lower sound intolerance compared to those who did not report noise sensitivity (p's ≤ 0.01). Furthermore, self-reported noise sensitivity was correlated with sound intolerance and psycho-affective symptoms (r's$2 \geq .63$). Thus sport-related traumatic brain injuries may lead to prolonged auditory hypersensitivity in a sub-set of athletes, which may be indicative of more pervasive symptomatology.

(534)

Nicole LeBarr (lebarran@mcmaster.ca), Judith M. Shedden
McMaster University

Object ownership: measuring associations between self-concept and owned objects

Previous research suggests that evaluation of owned objects is affected by associations with self-concept, but these experiments use indirect measures (e.g. preference) of these associations. Across 3 experiments, we examined more directly the relative association strength between self-representation and self-owned versus other-owned objects using the Implicit Association Test. We also compared long-term owned with newly-acquired objects to test whether the strength of this association is sensitive to length of ownership. Participants displayed greater association strength for self-owned than other-owned objects. Moreover, contrary to predictions in the literature, the link between self and self-owned objects was independent of length of ownership.

(535)

Michelle L Cadieux, Kaian Unwalla (unwallk@mcmaster.ca), David I Shore
McMaster University

Lying Down Disconnects the External World

Crossing the hands over the midline causes confusion when judging the order of successive vibrations. This crossed-hands deficit is caused by an interaction between information from the internal and external reference frame. During this talk I will discuss how altering the reliance on the external reference frame, through changes in body position, affects the crossed-hands deficit. Crossed hands accuracy improved when participants were lying down compared to sitting up, suggesting that degrading the external reference frame decreases the crossed-hands deficit. The findings suggest the crossed-hands deficit is the result of a conflict between the internal and external reference frames.

Colloquium Session 3
Sunday June 7, 2015 (3:30 – 4:30 p.m.)
Carleton University

Cognition and Applications II
University Centre 180
3:30 – 4:30 p.m.

(536)
Derek Koehler (dkoehler@uwaterloo.ca)
University of Waterloo

Can journalistic "false balance" distort public perception of consensus in expert opinion?

I report several experiments testing the influence of presenting conflicting comments from two experts who disagree on an issue (balance condition) in addition to a count of the number of experts on a panel who favor either side. Compared to a control condition, participants in the balance condition were not able to distinguish as clearly issues that did and that did not have strong expert consensus. Participants in the balance condition also perceived less agreement among the experts in general, and were less likely to think that there was enough agreement among experts on high-consensus issues to guide government policy.

(537)
Tariq A Hassan (tr216656@dal.ca), Raymond M Klein, Graham C Wilson
Dalhousie University

The AttentionTrip: A game-like task for Assessment of Attention Networks

Attention is believed to be composed of several overlapping systems mediating orienting, alerting and executive control. The Attention Network Task (ANT) is designed to measure these three components of attention with the use of mental chronometry. However, the repetitiveness of the ANT is liable to produce fatigue and disengagement. Here, we present a more engaging task to measure attention instantiated in a video game-like form: AttentionTrip. We show AttentionTrip can measure the same components of attention as the ANT, while providing several advancements.

(538*)
Gordon Pennycook (gpennyco@uwaterloo.ca), James Allan Cheyne, Nathaniel Barr, Jonathan A Fugelsang, Derek J Koehler
University of Waterloo

Bullshit proneness: Finding meaning in meaningless statements

Bullshit proneness refers to the propensity to believe that there is meaning in meaningless statements. Participants were given vague buzzwords randomly organized into statements with syntactic structure (e.g., "Hidden meaning transforms unparalleled abstract beauty"). We argue that these statements give off a sense of meaningfulness that requires an analytic reasoning process to override. Across multiple studies, participants who scored higher on analytic reasoning tests were less likely to rate bullshit statements as profound. There was no such association with motivational quotes (e.g., "A wet person does not fear the rain") or mundane statements (e.g., "Newborn babies require constant attention").

(539)
Nathaniel Barr (nbarr@uwaterloo.ca), Gordon Pennycook, Jennifer A. Stolz, Jonathan A. Fugelsang
University of Waterloo

The brain in your pocket: Evidence that Smartphones are used to supplant thinking

The advent of Smartphone technology provided us access to the internet nearly anytime and anywhere. This technological advance affords a knowledge store at our fingertips that is both vast and easily probed. We questioned whether this advance interacts with cognition by

exploring whether a relation exists between reliance on Smartphones for information and thinking style. Across three studies, we find that those who think more intuitively and less analytically when given reasoning problems were more likely to report relying on their Smartphone's search engine for information in their everyday lives.

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Language

University Centre 182
3:30 – 4:30 p.m.

(**540**)

Blair Armstrong (blair.c.armstrong@gmail.com), Manuel Perea, Arthur G. Samuel
Basque Center on Cognition, Brain, and Language (Spain)

Semantic access in written and spoken word comprehension: Evidence for interactions between the time-course of stimulus presentation and modality

We investigated whether semantic factors were stronger predictors of performance in auditory versus visual lexical decision, and observed stronger effects in the auditory modality. To evaluate whether the sequential versus simultaneous nature of stimulus presentation drives these effects, we then compared standard visual lexical decision with "sequential" visual lexical decision, in which letters were added to the display incrementally. No differences in semantic effects were detected, indicating that the results are due to an interaction between the processing dynamics of the comprehension system and the representation of the stimulus. Implications for computational models are discussed.

(**541**)

James Gordon Boylan (jboylan2@uwo.ca), Rod Martin, Albert Katz
University of Western Ontario

Latent Semantic Incongruity in Written Puns

Incongruity is frequently hypothesized to be necessary for something to be considered humorous but incongruity has been a challenging concept to operationalize for experimental study. The current study operationalizes incongruity as semantic distance. We created a database of written puns that rely on word polysemy (using either homographs, homophones, or paronymy) to create humorous incongruity. We used latent semantic analysis (LSA) to provide estimates of the latent semantic similarity between the implied concepts in written puns. Consistent with our incongruity theory based hypothesis, latent semantic similarity between alternate word meanings was negatively correlated with participant humour ratings.

(**542**)

Alison Heard (allyh@uvic.ca), Penny Pexman
University of Calgary

It's just not processing: investigating how negated language is processed

In the present research we investigated processing of verbal negation using a variant of the visual world paradigm called the Shopping Task. Participants' task is to select objects to complete the speaker's shopping list, and the speaker uses both negated (The next item is not candy) and affirmative (The next item is candy) sentences to direct the participant. Participants' eye gaze and reaching times were measured to compare processing of negated and affirmative sentences. Results are used to adjudicate between theories that suggest negation involves two stages of processing and theories that suggest direct access to negated meaning.

(**543**)

Brendan Johns [1] (bjohns11@gmail.com), Michael Jones [2], Douglas J. K. Mewhort [1]
Queen's University[1], *Indiana University*[2]

Experience as a Free Parameter in the Cognitive Modeling of Language

It is common practice to optimize the parameters of a model to account for behavioral data, due to

natural variability in processing strategies. There is another source of variability in behavior: the information that one has been exposed to. This talk will present a new method of fitting language-based data through experiential fitting. It will be shown that by combining standard models with this method, benchmark accounts of multiple data types can be achieved. This demonstrates that to construct complete explanations of behavior, both the internal workings of the mind and external experience have to be accounted for.

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Neuroscience II

River Building 2200
3:30 – 4:30 p.m.
(544: WITHDRAWN)

(545*)

Marc Fakhoury (marc.fakhoury@umontreal.ca)
University of Montreal

The dorsal diencephalic conduction system in reward

The present works aims at investigating the role of the dorsal diencephalic conduction system (DDC) in reward induced by electrical brain stimulation. For this purpose, rats were trained to receive an electrical stimulation at the lateral hypothalamus (LH). At the end of the experiment, Fos-like immunoreactivity was measured to visualize neurons activated by the stimulation. These measurements were compared with rats that receive the same stimulation but with a lesion at the DDC. Results show that electrolytic lesions at the DDC produced a large and long-lasting attenuation of reward, which correlated with reduced c-fos expression in the brain.

(546*)

Edward N. Wilson (edward.wilson@mail.mcgill.ca), M. Florencia Iulita, Sonia Do Carmo, A. Claudio Cuello
McGill University

Full reversal of cognitive decline in rat model of Alzheimer disease

Alzheimer disease is the leading cause of dementia worldwide and, currently, no cure exists. The disease is characterized by entorhinal, hippocampal, and prefrontal cortex degeneration, leading to deficits in spatial navigation, executive functioning, and learning and memory. It has been suggested that lithium may reduce the risk of developing Alzheimer disease. We tested whether lithium treatment has a beneficial effect on cognition in an Alzheimer disease rat model. We found that lithium completely reversed impairments in novel object recognition, spatial memory formation, and fear conditioning. These results support the further investigation of lithium as a possible Alzheimer disease therapeutic.

(547)

Nicole Ann Guitar (nguitar@uwo.ca), William A Roberts
University of Western Ontario

The Interaction Between Spatial Working and Reference Memory in a Radial Arm Maze with Rats

Memory is essential for both human and animal development and the remembrance of the locations

of food, shelter and threats. An experiment was conducted to investigate the interaction between working and reference memory in a radial maze with rats. The aim was to develop a model that could be used to demonstrate circumstances when working and reference memory are congruent and incongruent, as seen in everyday human life, and to test whether these memory systems are independent of one another. Results suggest that working and reference memory are independent but interacting systems that facilitate and compete with one another.

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Cognition III

River Building 1200

3:30 – 4:30 p.m.

(548)

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Carleton University

Dissociating Category Structure and Affective Ratings Using Promotion and Prevention Foci in a Categorization Task

Social psychological phenomena such as ingroup-outgroup biases reflect cognitive representations (e.g., stereotypes) and affective responses (e.g., prejudice). In the present study, we replicated previous findings that the frequency of training exemplars produced significant differences in categorization accuracy and affective ratings. Specifically, whereas decision certainty was the lowest around the category boundary, negative affect was highest for novel exemplars regardless of their location relative to the category boundary. Extending our previous findings, we also observed that instructions (prevention or promotion focus) altered both accuracy and affective ratings. We discuss how these results pertain to existing categorization models that addressing affect and novelty.

(549)

James William Patten (jwpatten@gmail.com), Thomas M Spalek
Simon Fraser University

Publically Observable Feedback Modulates Speed of Processing in Video-Game Players

Several aspects of visual attention and perception are thought to be affected by time spent playing action-oriented video-games. One such aspect is visual speed of processing (SOP). It was hypothesized that Video-Game Players (VGPs) may show improved speed of processing compared to typical individuals and furthermore that this improvement might be modulated by the extent to which VGPs felt their performance was publicly observable. This hypothesis was tested by varying the SOA between a pair of target letters and a mask. VGPs showed improved SOP only when their performance was made publicly observable via loud audio feedback.

(550)

Zorry Belchev (zorrybelchev@gmail.com), Glen E. Bodner
University of Calgary

Inducing Reversals in Aesthetic Choices Through Contrast

We show the malleability of aesthetic choices by inducing reversals in people's initial preference between a pair of average beauty abstract paintings. In the reversal condition, we paired their preferred painting with higher-beauty paintings (to make it less beautiful by contrast), and paired their non-preferred painting with lower-beauty paintings (to make it more beautiful by contrast). The initial pair was then presented again. Reversals were more likely in the reversal condition than in a control condition, thus establishing a reversal effect on aesthetic choice. We report additional experiments designed to delineate the basis of this reversal effect.

(551)

Swapna Krishnamoorthy
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McMaster University

Direct effects of mindfulness meditation training on cognitive control

Mindfulness meditation has been shown to enhance performance on various measures of attention and cognitive control. However, the underlying cognitive mechanisms leading to these performance benefits are not well understood. This study uses event-related potentials (ERPs) during the digit Stroop task to examine how neural activity in naïve meditators changes after two weeks of daily mindfulness practice. By contrasting mindfulness meditation training with a novel control condition, we identify behavioural and electrophysiological changes specifically associated with mindfulness meditation. These findings are discussed in terms of the cognitive control processes that vary as a function of mindfulness attention regulation.

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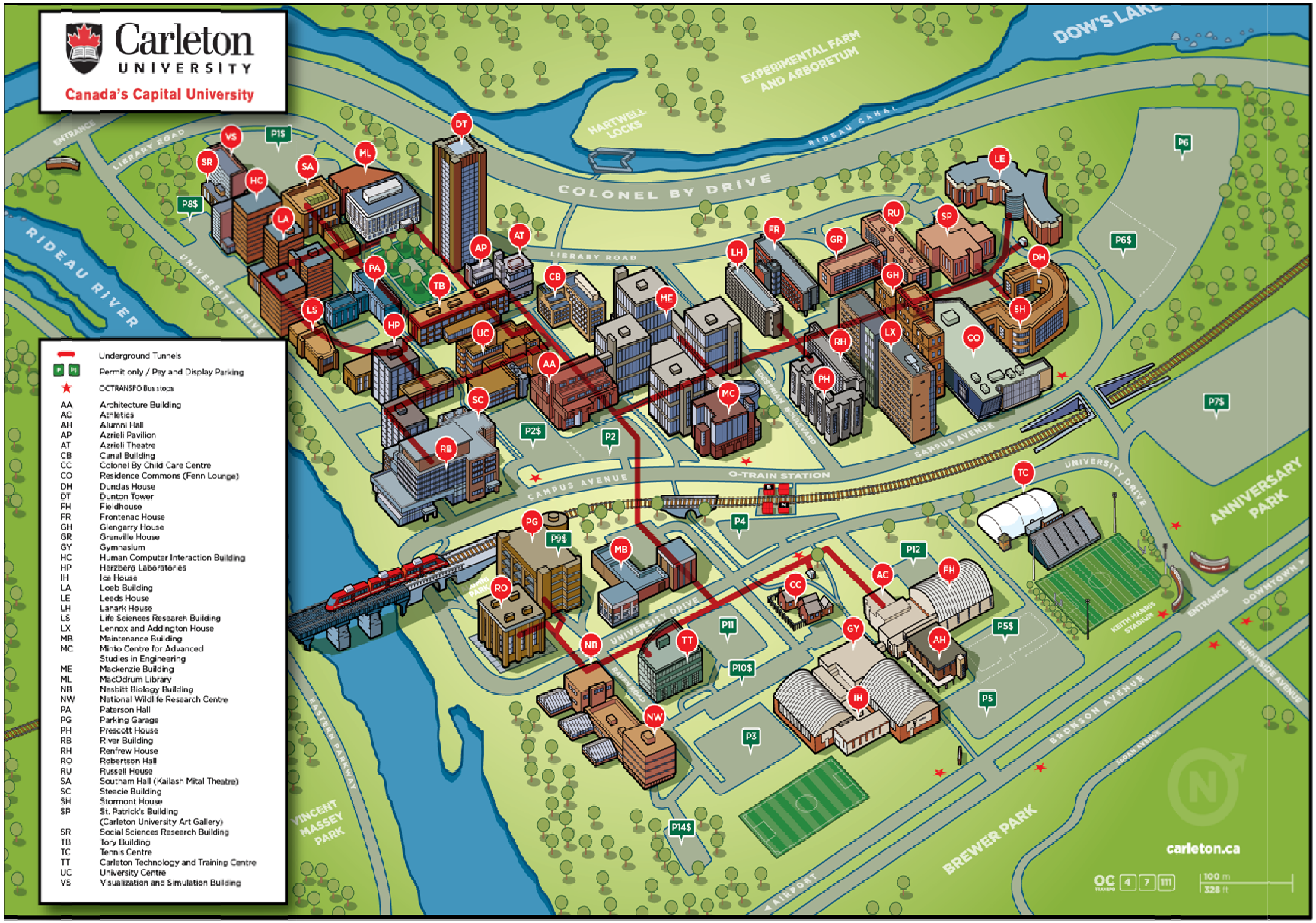
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CC Colonel By Child Care Centre
CO Residence Commons (Penn Lounge)
DH Dundas House
DT Dunton Tower
FH Fieldhouse
FR Frontenac House
GH Glengarry House
GR Grenville House
GY Gymnasium
HC Human Computer Interaction Building
HP Herzberg Laboratories
IH Ice House
LA Loeb Building
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LX Lennox and Addington House
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RB River Building
RH Renfrew House
RO Robertson Hall
RU Russell House
SA Southam Hall (Kailash Mital Theatre)
SC Steacie Building
SH Stormont House
SP St. Patrick's Building (Carleton University Art Gallery)
SR Social Sciences Research Building
TB Tory Building
TC Tennis Centre
TT Carleton Technology and Training Centre
UC University Centre
VS Visualization and Simulation Building
DOW'S LAKE
EXPERIMENTAL FARM AND ARBORETUM
HARTWELL LOCKS
RIDEAU CANAL
COLONEL BY DRIVE
LIBRARY ROAD
ENTRANCE
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