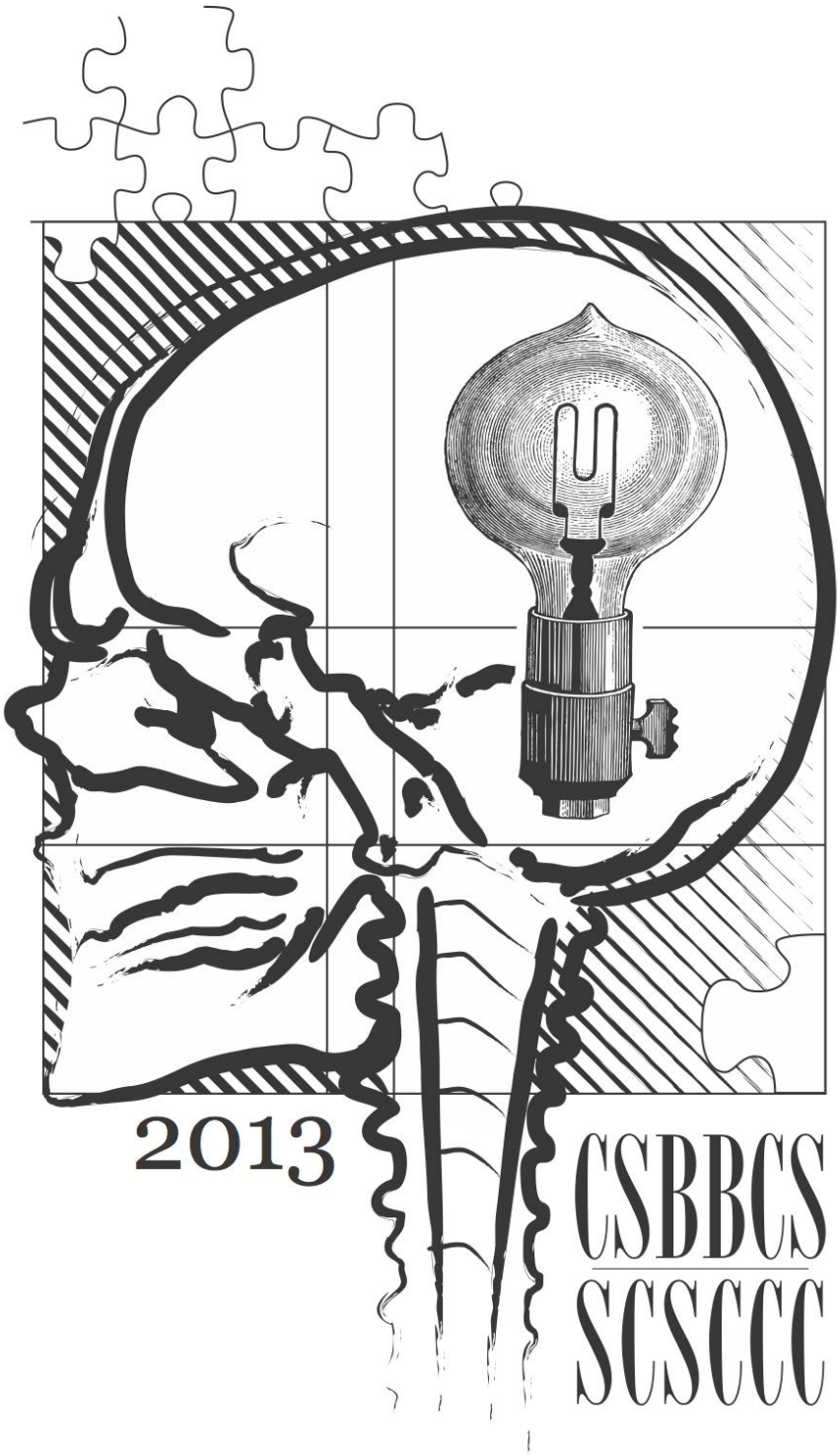

University of Calgary - June 7-9

23rd annual meeting of the Canadian Society for Brain, Behaviour, and Cognitive Science

UNIVERSITY OF CALGARY

These groups on campus are pleased to sponsor this initiative:

Vice-President (Research) | Faculty of Arts | Department of Psychology | Graduate Students' Association | Hotchkiss Brain Institute

General Information

Breakfast/Coffee. We have arranged for the Dining Centre (beside Hotel Alma and residences) to provide full hot and cold breakfast options for under $10 beginning at 8 am on Saturday and Sunday. Limited breakfast options and coffee/tea/juice will be provided Saturday morning at Poster Session 2, but neither is provided on Sunday morning, so we recommend that you fuel up at the Dining Centre prior to the conference both days.

Symposia and Paper Sessions. Paper presentations are allotted 15 minutes including time for questions/discussion. Computers with PowerPoint software will be available in each room. Please arrive 15 minutes prior to the start of your session and load/test your presentation, or test out your laptop connection, so the conference can stay on schedule.

Poster Sessions. Maximum poster size is 46" x 46". Please put your poster up at least 15 minutes before the scheduled start time of your Poster Session. It should remain up until after the Poster Session ends. Poster pins will be provided. Your poster should be uploaded to the CSBBCS website prior to the conference.

Black Lounge Pub Night Dinner/Reception. This event will be held on Friday June 7 (7:15 pm to 1 am) in the Black Lounge in MacEwan Hall. Tickets were sold online until May 30 and are not available on site. Purchased tickets will be provided when you register and you MUST show your ticket to be admitted to the event.

Wi-Fi Access. Attendees can access free wi-fi on campus via the AirUC wireless network during the conference. The username is **cgy.csbbcs** and password is **cgy.2013**. Guests at Hotel Alma and residences receive free wi-fi access.

ATMs. There are several ATMs in MacEwan Student Centre building on the second floor, behind Fuel for Gold.

Parking. Attendees can park in lots as indicated on this parking map: http://www.ucalgary.ca/map/.

CTrain (LRT). For $3, Calgary's CTrain will take you directly from the University station to the lively restaurant, pub, and shopping areas of Kensington (Sunnyside station) and downtown (various stations along 7th Ave). The last CTrain back to University station is around 1 am, after which you will need to take a taxi.

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Program Overview

Date	Time	Place	Event
Friday, June 7	3:00-7:00 pm	EEEL	Registration (also available Sat in EEEL and Sun in ICT)
	4:00-5:30 pm	EEEL	Poster Session 1 (light appetizers and snacks provided)
	5:45-6:00 pm	ST 140	Welcome and Orientation/Award Presentations
	6:00-7:00 pm	ST 140	Donald O. Hebb Distinguished Contribution Award Address
	7:15 pm-1 am	Mac Hall	Black Lounge Pub Night Dinner/Reception (ticket holders only)
Saturday, June 8	9:00-10:30 am	EEEL	Poster Session 2 (light breakfast and coffee, tea, juice provided)
	10:30-12:15 pm	DC	CSBBCS President's Symposium (Alberta Room)
	12:15-1:15 pm	DC patio	BBQ Lunch (provided)
	1:30-2:30 pm	ICT	Symposia and Papers 1 (4 parallel sessions)
	2:45-3:45 pm	ICT	Symposia and Papers 2 (4 parallel sessions)
	4:00-5:00 pm	ICT	Symposia and Papers 3 (4 parallel sessions)
	5:00-6:30 pm	EEEL	Poster Session 3 (light snacks provided)
Sunday, June 9	9:30-10:30 am	ICT	Symposia and Papers 4 (4 parallel sessions)
	10:45-11:45 pm	ICT	Symposia and Papers 5 (4 parallel sessions)
	12:00-1:00 pm	ICT	Symposia and Papers 6 (4 parallel sessions)
	11:30-1:30 pm	TBA	Bag Lunch (provided)
	1:15-2:15 pm	ICT 121	NSERC Workshop (hosted by NSERC)
	2:30-4:00 pm	ICT 116	CSBBCS Business Meeting

Notes: EEEL = EEEL lobby, ST = Science Theatre, Mac Hall = MacEwan Hall, DC = Dining Centre, ICT = ICT classrooms

Presentations under consideration for the Donald O. Hebb Graduate Student Award Competition indicated with *

Donald O. Hebb Distinguished Contribution Award Address (ST 140, Friday 6:00-7:00 pm)

1. *Human Perception: A science of synergy*
James T. Enns, University of British Columbia

CSBBCS President's Symposium (Alberta Room in Dining Centre; Saturday 10:30-12:15 pm)

Reasoning and rationality
Chair: Valerie A. Thompson, University of Saskatchewan
Abstract: A fundamental puzzle for the psychology of reasoning is this: Humans are capable of enormous intellectual achievements but still fall prey to egregious errors of reasoning and decision-making. This symposium presents four perspectives on this issue. Markovits and Toplak each adopt a developmental perspective that examines changes in rational thinking as a function of the ability to derive alternative conclusions. Like Toplak, Ball uses Stanovich's (2009) dual process model to examine individual differences in rationality as a function of cognitive capacity and thinking dispositions, while Thompson presents a metacognitive analysis of reasoning errors also situated within a dual process perspective.

2. *Divergent thinking and the development of conditional reasoning*
Henry Markovits, Université du Québec à Montréal

3. *Converging patterns between developmental trends and cognitive abilities*
Maggie E. Toplak, York University; Richard F. West, James Madison University; Keith E. Stanovich, University of Toronto

4. *Individual differences and the algorithmic and reflective minds: The case of belief bias*
Linden J. Ball, University of Central Lancashire; Melanie Pitchford, University of Bedfordshire

5. Intuition, Metacognition, and Analytic Thinking
Valerie A. Thompson, University of Saskatchewan

Symposia and Papers 1 (Saturday 1:30 – 2:30 pm)

ICT 121	ICT 122	ICT 114	ICT 116
Symposium: Modulating Visuospatial Attention: Evident from Event-related Potentials	**Cognitive Processes 1**	**Language and Reading**	**Memory 1**
1:30 pm	1:30 pm	1:30 pm	1:30 pm
6. Segregation of target representation and distractor suppression through the manipulation of distance and non-salient distractors Corriveau, Fortier-Gauthier, Jolicoeur	10. Individual differences in mind wandering predict cognitive style Thomson, Seli, Besner, Smilek	14. Validation during reading: An individual differences analysis Singer, Doering	18. Absolute and relative judgments of similarity yield different fillers in eyewitness lineups Oriet, Fitzgerald
1:45 pm	1:45 pm	1:45 pm	1:45 pm
7. Efficient attentional selection despite inefficient search Christie, Livingstone, Gaspar, McDonald	11. Controlled versus automatic' parallelism in dual-task performance Thomson, Danis, Watter	15. Reading aloud: Interactive activation reconsidered Robidoux, Besner	19. Forced-choice recognition: Processes and strategies Mewhort, Johns
2:00 pm	2:00 pm	2:00 pm	2:00 pm
8. Active suppression of salient-but-irrelevant items increases visual working memory capacity *Gaspar, Christie, Livingstone, McDonald	12. Modelling nonanalytic similarity judgements in a multiple-trace framework Hannah, Mewhort	16. The development of gender-differentiated speech in adolescence Diano, Ward-Sutherland, Li	20. Context effects on recognition judgments are modulated by the judgment options Tousignant, Bodner, Arnold
2:15 pm	2:15 pm	2:15 pm	2:15 pm
9. Visual search takes time: Temporal variability of the N2pc Dowdall, Strüngmann, Luczak, Tata	13. Inhibitory repetition effects: Opposing influences of event updating and new event encoding D'Angelo, Qiu, Zavarella, Milliken	17. The effect of bilingualism on lexical ambiguity processing in older adults Kousaie, Deller, Taler	21. Metamemory for emotional words Hourihan

Symposia and Papers 2 (Saturday 2:45 – 3:45pm)

ICT 121	ICT 122	ICT 114	ICT 116
Attention 1	**Human/ Cognitive Neuroscience 1**	**Symposium: Further Examination of Math Cognition in Children**	**Symposium: The Effects of Production on Memory**
2:45 pm	2:45 pm	2:45 pm	2:45 pm
22. A novel paradigm reveals the role of reentrant visual processes in object substitution masking Jannati, Spalek, Di Lollo	26. An fMRI study of age-related differences in complex object discrimination Ryan, Cardoza	30. Short-term gain in early numeracy skill: Mapping quantitative to symbolic representations LeFevre, Dunbar, Ridha, Sowinski, Xu, Wells, Jimenez Lira	34. Evaluating the basis of the between-subject production effect Taikh, Bodner
3:00 pm	3:00 pm	3:00 pm	3:00 pm
23. Looking for the key to inhibition of return in everyday search Snyder, Bischof	27. Slot machine gambling: can monetary losses make you play longer? Graydon, Dixon, Harrigan, Fugelsang, Stange, Chhay	31. Exploring the role of metacognition in young children's math development Drefs	35. The benefits and costs of production *Forrin, Groot, MacLeod
3:15 pm	3:15 pm	3:15 pm	3:15 pm
24. A gaze in the crowd: Soci attention is resilient to perceptual load Hayward, Ristic	28. Only in close range: Modulating visuospatial attention deployment with stimulus similarity Aubin, Jolicoeur	32. Can tablet computers facilitate children's understanding of mathematics Dubé, McEwan	36. The effects of divided attention at encoding Slaney**,** Hourihan
3:30 pm	3:30 pm	3:30 pm	3:30 pm
25. Is F>R IOR in item method directed forgetting a selective modulation of the motoric flavour of IOR? Thompson, Taylor	29. How spatial multiplexing solves Information bottlenecks in central nervous systems Nilsson	33. Motivational characteristic differences between procedural and conceptual fraction learners Bakhtiar, Hallett, Fitzpatrick	37. Enhancing the production effect in memory *Quinlan, Taylor

Symposia and Papers 3 (Saturday 4:00 – 5:00 pm)

ICT 121	ICT 122	ICT 114	ICT 116
Symposium: Embodied Cognition	**Memory 2**	**Animal Neuroscience**	**Perception 1**
4:00 pm	4:00 pm	4:00 pm	4:00 pm
38. Embodied comprehension of sentences *Heard, Masson, Bub	42. How similar is too similar? Establishing the upper bounds of eyewitness lineup similarity *Fitzgerald, Oriet, Price	46. A new test of object-recognition memory for rats *Cole, Huxley, Munden, Mumby	50. Beyond fear: Exposure to angry and surprised faces enhances early visual perception Perrotta, Caliciuri, Wachowiak, Nicol
4:15 pm	4:15 pm	4:15 pm	4:15 pm
39. Effects of emotional, motor, and sensory information in abstract and concrete word processing Siakaluk, Moffat, Knol, Pelletier	43. Modulatory effect of 17-β estradiol on performance of ovariectomized rats on the Shock-Probe task Gervais, Jacob, Barrett-Bernstein, Brake, Mumby	47. Prenatal activation of orexinergic neurons Pompeiano, Lee, Godden	51. Determinants of External Normalization Dunn
4:30 pm	4:30 pm	4:30 pm	4:30 pm
40. 'How would YOU interact with this?' FMRI BOLD activation during overt semantic generation to action-related pictures and words Esopenko, Gould, Cummine, Sarty, Kuhlmann, Borowsky	44. False recognition of instruction-set lures *Curtis, Chubala, Spear, Jamieson, Hockley, Crump	48. Noninvasive molecular imaging demonstrates waking-like brain states in bird embryos Balaban	52. Humans show relative rule-based encoding of obtuse geometric angles Reichert, Kelly
4:45 pm	4:45 pm	4:45 pm	4:45 pm
41. Tongue tied: Suppressing articulation decreases the bouba/kiki effect *Sidhu, Pexman	45. Less is more? The influence of the number of available features on the encoding of geometry in virtual environments Ambosta, Kelly	49. Effects of maternal stress and perinatal fluoxetine exposure on behavioural outcomes of adult offspring *Kiryanova, Iablokova, Dyck	53. Gestural actions hold and direct visual attention Foroud, Klein, Newman, Eskes

Symposia and Papers 4 (Sunday 9:30 – 10:30 am)

ICT 121	ICT 122	ICT 114	ICT 116
Attention 2	**Human/ Cognitive Neuroscience 2**	**Animal Behavior**	**Symposium: Numerical Cognition: Memory Processes in Mental Arithmetic, Number Comparison, and Ordinality**
9:30 am	9:30 am	9:30 am	9:30 am
54. The role of meaning in colour-word contingency learning Lin, MacLeod	58. Ignorance is avoidance: ERP evidence for obstacle suppression during reach avoidance Chapman, Truong, Granados-Samoyoa, Badiudeen, Enns	62. Wall colour-geometry associations in a kite box Cole	66. Retrieval-induced forgetting of arithmetic facts but not rules Campbell, Therriault
9:45 am	9:45 am	9:45 am	9:45 am
55. Semantic priming in change detection LaPointe, Khaja, Milliken	59. Is the hand's automatic pilot sensitive to the frequency of a target jump? Howe, Striemer	63. Parallel mathematical descriptions of spatial behaviour in human infants and rats Nemati	67. Measuring the working memory requirements of mental arithmetic Faulkenberry, Montgomery
10:00 am	10:00 am	10:00 am	10:00 am
56. Exploring the role of context on episodic memory retrieval during mind wandering behavior Vinski, Smallwood, Watter	60. The effect of context on recognition of objects Brodeur, Maguire, Bouras	64. To cache or not to cache: do Clark's nutcrackers protect their caches in cooperative contexts? Clary, Kelly	68. Eye tracking and simple arithmetic: The influence of problem size on fixation patterns across four operations Huebner, Curtis, LeFevre
10:15 am	10:15 am	10:15 am	10:15 am
57. Context in cognitive control Gough, Garcia, Milliken	61. Observational motor learning as a function of the expertise in a slicing task Maltseva, Brown (now last poster in Poster Session 2)	65. Not all effort Is equal: Anterior cingulate cortex and effort-based decisions *Holec, Euston	69. Symbolic and non-symbolic distance effects in number comparison and ordinality tasks Penner-Wilger

Symposia and Papers 5 (Sunday 10:45 – 11:45 am)

ICT 121	ICT 122	ICT 114	ICT 116
Attention 3	**Cognitive Processes 2**	**Symposium: Development of Concepts and Categorization**	**Neuropsychology/ Development**
10:45 am	10:45 am	10:45 am	10:45 am
70. Media multitasking and failures of attention Ralph, Thomson, Cheyne, Smilek	74. The role of context in the simultaneous learning of two complementary sequences D'Angelo, Milliken, Jiménez, Lupiañez	78. Categorization across symbolic modalities: The effect of labeling on infants' inductive inferences Khu, Graham, Ganea	82. Strategies and pseudoneglect on luminance judgments: An eye-tracking investigation Saint-Aubin, Voyer, Cook
11:00 am	11:00 am	11:00 am	11:00 am
71. Neuroimaging of visual attention in migraineurs between headache attacks Mickleborough, Gould, Handy, Babyn, Borowsky	75. Sequential effects in an attentional blink (AB) task MacLellan, Milliken, Shore	79. Inductive reasoning: Examining 11-month-olds' abilities Vukatana, Graham, Curtin	83. Dissociations in visual recognition in children with developmental prosopagnosia Dalrymple, Duchaine
11:15 am	11:15 am	11:15 am	11:15 am
72. Affective consequences of inhibition in working memory *De Vito, Fenske	76. Privileged loops between perception and action: It's hard to sit on your hands when processing direction O'Malle, Besner	80. I brush my hair with this spoon: 24-month-olds' learn unconventional labels from unconventional actors Schell, Graham, Henderson	84. What do direct corticoneurons do? *Karl, Whishaw
11:30 am	11:30 am	11:30 am	11:30 am
73. The effects of target knowledge on search for linearly and nonlinearly-separable targets Brand, Oriet, Wolfe	77. Consumed by the self: Evidence for degraded perceptual processing during self-referential judgement tasks Vinski, Wong, Smallwood, Watter	81. Development of the concept of antonymy: Evidence for sudden insight or gradual acquisition? *Phillips, Pexman	85. Do pre-school aged children expect unconventional speakers to maintain consistency in referential expressions? Wellsby, Khu, Sedivy, Graham

Symposia and Papers 6 (Sunday 12:00 – 1:00 pm)

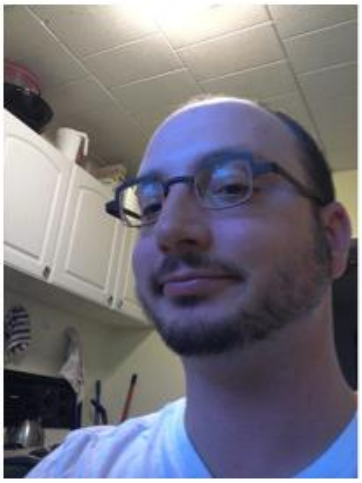
ICT 121	ICT 122	ICT 114	ICT 116
Symposium: Neuroimaging Change: Reorganization Across Contexts	**Memory 3**	**Cognitive Processes 3**	**Perception 2**
12:00 pm	12:00 pm	12:00 pm	12:00 pm
86. Providing a frame for the construction of meaning: An electrophysiological investigation of task effects in visual word recognition *Hargreaves, Pexman	90. Why is recognition memory response bias conservative on paintings? Lindsay, Fallow, Kantner, Rosenberg, Lyris Freeman	94. The role of conflict in memory formation Rosner, D'Angelo, MacLellan, Milliken	98. Representation of emotion with colour is embodied Humphrey
12:15 pm	12:15 pm	12:15 pm	12:15 pm
87. A hobby can alter your brain: Neural correlates of visual word recognition in competitive scrabble players Protzner, Pexman, Campbell, Hargreaves, Zdrazilova, Seyffarth, Sargious	91. Forgive and forget? No, not really Birt, Fanning	95. A philosophical reflection on mirror neurons Ramlakhan	99. Asynchrony and information processing in networks of spiking neurons Kuebler, Thivierge
12:30 pm	12:30 pm	12:30 pm	12:30 pm
88. Individual variability in spatial orientation and neural network topology Arnold, Protzner, Bray, Levy, Iaria	92. Does assessing recollection influence confidence? Williams, Lindsay	96. Memory biases drive decisions from experience *Madan, Ludvig, Spetch	100. Taking a jab at the 'hard problem' Kurowski
12:45 pm	12:45 pm	12:45 pm	12:45 pm
89. Changes in the neural correlates of episodic memory with healthy aging Rajah	93. Measuring individual differences in prospective memory Uttl, White, Wong Gonzalez, Hodgson	97. The cost of repeating a task Dixon	101. Representing shared action goals: How novices learn to perform piano duets Loehr, Vesper

Donald O. Hebb Graduate Student Awards CSBBCS 2012 (Queen's University)

For the individual who, in the opinion of the awards committee, has been judged to have presented the best paper or poster at the annual CSBBCS meeting.

Best Paper: Blair C. Armstrong, Carnegie Mellon University (Armstrong & Plaut)
Honorable Mention: Tanya R. Yonker, University of Waterloo (Yonker, Seli, & MacLeod)
Best Poster: Brian Mathias, McGill University (Mathias, Palmer, Perrin, & Tillmann)
Honorable Mention: Kevin R. Barton, University of Waterloo (Barton & Ellard)

CSBBCS Early Career Award 2013



David R. Feinberg, PhD
Assistant Professor
Department of Psychology, Neuroscience, and Behaviour
McMaster University

BSc (Rutgers University)
PhD (St. Andrews University)

For exceptional quality and importance of contributions of a new researcher to knowledge in brain, behaviour, and cognitive science.

Excerpts from the nomination letter:

David uses psychological and evolutionary approaches to investigate vocal attractiveness and preferences, and he also has established fruitful collaborations with some of the world's leading face perception researchers. David is recognized internationally as a leading researcher in his field, and many of his papers have employed novel software for voice and face manipulations to provide the first rigorous experimental tests of human vocal and facial preferences. For example, David was the first person i) to manipulate voice pitch and experimentally test its effects on preferences (Feinberg et al., 2005a); ii) to demonstrate that voice pitch predicts reproductive success (Apicella, Feinberg, & Marlow, 2007); and iii) that women who use hormonal contraceptives (Feinberg et al 2008a) and who are breastfeeding (Apicella & Feinberg 2009) prefer men with higher pitched men's voices.

Since 2004, David has publishing 58 articles in peer-reviewed journals, 42 since joining McMaster, which have appeared in top journals with impact factors between 3-5 (e.g., Proceedings of the Royal Society of London B, Psychological Science, PLOS1, Psychoneuroendocrinology, Hormones and Behaviour, Biology Letters, Evolution & Human Behavior, and Animal Behaviour). This constitutes an *outstanding* publication record for a young investigator. Moreover, David's work has had substantial impact. He also has given multiple invited seminars and interviews on radio and TV about his research, and his work has received extensive coverage by Time Magazine, Psychology Today, Science Daily, The New York Times, The Globe & Mail, BBC, CBC, NPR, and many other internationally syndicated news outlets.

In summary, David is an exceptional young scientist who has established several novel and interesting lines of research. David's extraordinary productivity, the novelty and influence of his work, and his elevated status in the field of evolutionary psychology make him a worthy recipient of a CSBBCS Early Career Award.

Donald O. Hebb Distinguished Contribution Award 2013

James T. Enns, PhD, FRSC
Distinguished University Professor
Department of Psychology
University of British Columbia

BA (Hons) (University of Winnipeg)
MA, PhD (Princeton University)

For significant contribution to the study of brain, behaviour, and cognitive science.

Hebb Award Address: Human Perception: A science of synergy

Excerpts from the nomination letter:

For 25 years UBC and Canada have benefitted from Jim's knowledge and desire to serve the discipline of Psychology.

It would be very difficult to have a better research record than Jim's, especially on a per year basis. Jim spared us the difficulty of counting his publications by numbering them. He has been extremely productive with 144 journal publications (cited over 4000 times) and 21 book chapters. Jim has an astounding 11 publications in *Psychological Science*, 1 in *Science*, 2 in *Trends in Cognitive Science*, 10 in *JEP:HPP* and 5 in *JEP:General*. Jim has also co-written several editions of his *Sensation and Perception* textbook, solo authored his book *The thinking eye, the seeing brain*, edited 3 volumes on attention, and launched a software company.

Jim's research is also diverse in scope and approach, including perception and art, attention, computational vision, perceptual development. Jim is a master of good experimental design, and is skilled both at thinking "in the box" and "out of the box" when it comes to research ideas and design. Jim is also clearly a go-to person for those looking for excellent post-doctoral training in visual cognition. His CV lists an impressive 17 post-doctoral fellowship supervisions. The list of post-doctoral names from his lab reads like a who's-who of influential young scientists in visual cognition.

Jim is currently the Editor of *Journal of Experimental Psychology: Human Perception and Performance*. Jim has truly shown excellent leadership with JEP:HPP, and his vision and leadership have helped maintain the reputation of an important journal in our field. Jim has also held Associate Editor positions at *Consciousness and Cognition* (2007-2010), *Perception and Psychophysics* (2005-2007), *Visual Cognition* (1992-2004) and *Psychological Science* (2000-2003), and is a long standing Editorial Board member at *Visual Cognition* (2004 to present) and the *Canadian Journal of Experimental Psychology* (1996-present). Jim has also been a member of the Vision Sciences Society Organizing committee since 2000, a member of the Attention and Performance Organizing Committee and Advisory Council since 2000, and he organized the 2002 CSBBCS conference in Vancouver.

Jim has been recognized for his accomplishments with the title of Distinguished University Scholar at UBC. Jim has also been made a Fellow of the Society of Experimental Psychologists, a Fellow of the Association for Psychological Science, and in 2002 became a Fellow of the Royal Society of Canada. Despite his numerous accomplishments he is a remarkably grounded and humble person and still finds time for family, travel, and athletic pursuits such as mountain climbing and marathons.

Donald O. Hebb Distinguished Contribution Award Address (ST 140; Friday 6:00 - 7:00 pm)

1. *Human Perception: A science of synergy*
James T. Enns, University of British Columbia

It's fair to say that my life-long interest in human perception has revolved around what psychologists call interactions, rather than main effects. My studies began by asking how the brain of the child interacted with the external world and how that interaction changed perceptual experience in development. They moved on to ask how the two-dimensional surface of the retina interacts with three-dimensional objects, eventually culminating in a view that the brain is fundamentally a predictive device rather than a recording machine. My lab[1]s current research efforts are aimed at many two-way roads, including those involving attention and emotion (studied through the visual art experience), perception and social awareness (studied through playing and listening to jazz music), perception and action (studied by watching how people act to optimize reward), social collaboration and cognition (studied by measuring when two heads can see better than one), and sensation and categorical thought (studied by asking whether synesthesthetic experiences are useful in learning about the world). Of course, beneath this emphasis on the synergy of human perception, lies the critical synergy that occurs when curious minds from different research communities put their heads together on a question concerning the human condition.

CSBBCS President's Symposium (Alberta Room in Dining Centre; Saturday 10:30 - 12:15 pm)

Reasoning and rationality
Chair: Valerie A. Thompson, University of Saskatchewan
Abstract: A fundamental puzzle for the psychology of reasoning is this: Humans are capable of enormous intellectual achievements but still fall prey to egregious errors of reasoning and decision-making. This symposium presents four perspectives on this issue. Markovits and Toplak each adopt a developmental perspective that examines changes in rational thinking as a function of the ability to derive alternative conclusions. Like Toplak, Ball uses Stanovich's (2009) dual process model to examine individual differences in rationality as a function of cognitive capacity and thinking dispositions, while Thompson presents a metacognitive analysis of reasoning errors also situated within a dual process perspective.

2. *Divergent thinking and the development of conditional reasoning*
Henry Markovits, Université du Québec à Montréal

Conditional (if-then) reasoning is a critical component of advanced thinking. Developmental studies show a confused pattern of empirical results, with some studies showing that very young children can reason logically while others show that even well-educated adults do not do so. In the following, I will present a synthesis of these apparently divergent results into a single developmental model. The key idea is that logical thinking depends on the ability to generate multiple possibilities (a form of divergent thinking) in order to distinguish between valid and invalid conclusions. The ability to generate such possibilities goes through developmental stages, from very concrete to abstract. This allows young children to reason logically with a limited class of propositions. Reasoning with abstract propositions is developmentally more difficult, despite requiring the same level of algorithmic difficulty.

3. *Converging patterns between developmental trends and cognitive abilities*
Maggie E. Toplak, York University; Richard F. West, James Madison University; Keith E. Stanovich, University of Toronto

Many cognitive abilities show a steady increase developmentally, but this is not necessarily accompanied by better rational thinking performance. Children (N=204) aged 8-14 years of age completed several measures of rational thinking and cognitive ability. Developmental differences were found on probabilistic choice, belief bias syllogisms, resistance to framing, and baserate sensitivity, with older children performing better than younger children. No developmental differences were observed on the myside bias task. Associations with cognitive ability were

consistent with these developmental patterns. These findings are consistent with predictions from dual process models of rational thinking and with data patterns from young adult samples.

4. *Individual differences and the algorithmic and reflective minds: The case of belief bias*
Linden J. Ball, University of Central Lancashire; Melanie Pitchford, University of Bedfordshire

Individual differences in belief bias were investigated by focusing on the functioning of the "algorithmic mind", operationalized as working memory capacity, and the ,"reflective mind,", assessed using the Actively Open Minded Thinking scale. The Cognitive Reflection Test was also deployed to assess abilities at overriding intuitively compelling answers. Whilst individuals with higher working memory capacities took longer to process logic/belief conflict syllogisms this did not improve normative responding. What did predict normative responses was a propensity toward open minded thinking and the ability to override intuitive responses. These findings place the reflective mind at centre stage in accounting for belief-bias effects.

5. Intuition, Metacognition, and Analytic Thinking
Valerie A. Thompson, University of Saskatchewan

I will present a model that integrates basic principles of reasoning and metacognition, and that potentially resolves the issue of predicting when and how analytic processes are engaged. In this model, initial responses to reasoning problems have two components. The first is the intuitive answer itself and the second is an emotional response that accompanies the answer called the Feeling of Rightness (FOR). This FOR forms the basis of a metacognitive judgment, which, in turn, predicts the extent of subsequent analytic engagement. I will also discuss the results of a number of studies that examine the origin of the FOR.

SYMPOSIA AND PAPERS 1 - SATURDAY, JUNE 8 (1:30-2:30)

ICT121

Symposium: Modulating Visuospatial Attention: Evident from Event-related Potentials
Chair: Isabelle Corriveau, Université de Montréal
Abstract: The fine temporal sensitivity of electroencephalographic data allows for the isolation of event-related potential (ERP) components representing early and rapid cognitive processes. Specific components have been associated to the visual attention pipeline: the N2pc, reflecting the deployment of visuospatial attention, and the PD, reflecting distractor suppression mechanisms. This symposium will focus on various factors that modulate the amplitude and latency of these two ERP components. In particular, we will explore the role of the characteristics of the distractors, individual difference in visual short-term memory capacity, and variability in the time required for target detection in visual search.

6. *Segregation of target representation and distractor suppression through the manipulation of distance and non-salient distractors*
Isabelle Corriveau, Ulysse Fortier-Gauthier, Pierre Jolicoeur, Université de Montréal

The N2pc, an event-related potential component, reflects processes of visuospatial attention deployment. When visual search is difficult, certain factors are known to modulate this component. In this study, participants had to distinguish a salient target from a salient distractor and multiple non-salient distractors. Salient items were positioned in order to isolate processes responsible for target representation and distractor suppression. Results show that target representation can be influenced by the presence of non-salient distracters and by the level of separation between the target and salient distractor, where as distractor suppression is solely influenced by the presence of non-salient distractors.

7. *Efficient attentional selection despite inefficient search*
Gregory J. Christie, Ashley C. Livingstone, John M. Gaspar, John J. McDonald, Simon Fraser University

We present results from two search tasks in which observers located a target defined by a unique color (a singleton) among heterogeneously colored distractors. Response times increased with the number of items to be searched, suggesting inefficient search for the target. However, the selection of the target, assessed by N2pc,

occurred at the same latency regardless of set size, that is, the set-size function for N2pc latency was flat. Intertrial priming of this pop-out target was also observed. These results demonstrate that it is possible for attention to rapidly and efficiently select relevant objects despite behavioral evidence to the contrary.

8. *Active suppression of salient-but-irrelevant items increases visual working memory capacity*
*John M. Gaspar, Gregory J. Christie, Ashley C. Livingstone, John J. McDonald, Simon Fraser University

High-capacity individuals are better able to restrict irrelevant items from entering visual short term memory (VSTM) but the mechanism by which this is accomplished remains unclear. We investigated whether individual VSTM capacity scores (k) relate to an ERP component associated with the suppression of irrelevant visual items; the distractor positivity (PD). We observed the amplitude of the PD to correlate positively with individual k scores. These results provide direct evidence for a relationship between the attentional suppression and efficient VSTM processing, suggesting the PD may be an important neural mechanism for restricting access to the VSTM system.

9. *Visual search takes time: Temporal variability of the N2pc*
Jarrod R. Dowdall, Ernst Strüngmann Institute for Neuroscience in Cooperation with Max Planck Society; Artur Luczak, University of Lethbridge; Matthew S. Tata, University of Lethbridge

Processing sensory information in our world leads to a sequence of neural events at distinct latencies. The earliest of those events being related to characteristics of the sensory information, and the later being more cognitive processing. Given a task with different levels of cognitive demand, one might expect an increase in the latency or temporal variability of cognitive events related task demands. The N2pc component of the ERP may be such an event. We observed that the latency of the N2pc during non-popout search (more demanding visual search) is more variable than during popout search (less demanding search).

ICT122

Papers: Cognitive Processes 1
Moderator: Samuel Hannah, University of Saskatchewan

10. *Individual differences in mind wandering predict cognitive style*
David R. Thomson, Paul Seli, Derek Besner, Daniel Smilek, University of Waterloo

We tested the hypothesis that an individual's propensity to engage in off-task thought (mind wandering) would be related to broader deficits in controlled attention. We assessed mind wandering via self-report in a Sustained Attention to Response Task (SART) and then compared performance between 'high' and 'low' mind wanderers in a task-switching paradigm. Results show that high mind wanders exhibited smaller task-switch costs and additionally, placed greater emphasis on speed (at the expense of accuracy) relative to low mind wanderers. We argue that individual differences in mind wandering reflect stable differences in one's ability (or willingness) to engage in controlled processing.

11. *Controlled versus automatic parallelism in dual-task performance*
Sandra J. Thomson, Lila K. Danis, Scott Watter, McMaster University

The relative efficiency of parallel versus serial processing in dual-task performance depends on the experimentally-selected distribution of SOAs in a psychological refractory period (PRP) paradigm, with predominantly short SOAs favouring a more parallel mode. We replicate similar findings in a blocked SOA PRP paradigm, but show that a marker of automatic parallel response activation, the backward response compatibility effect (BCE), does not vary with SOA context. These findings indicate that PRP slope effects on Task 2 RT suggesting more or less parallel overt dual-task performance are mechanistically distinct from processes generating automatic parallel response activation in Task 2.

12. *Modeling nonanalytic similarity judgments in a multiple-trace framework*
Samuel Hannah, University of Saskatchewan; Douglas J. K. Mewhort, Queen's University

Researchers have produced conflicting evidence as to whether overall similarity operates as a nonanalytic (Smith & Kemler Nelson, 1984) or analytic (Milton, Longmore & Wills, 2008) process. Hannah and Brooks (2009) suggested that different levels of abstraction across feature representation could support different forms of judgment and decision-making; thus, similarity may not be a unitary process, but one that varies with the level of abstraction of feature representation. Building on this insight, we present a model of nonanalytic similarity judgement based on Hintzman's Minerva 2 framework that incorporates multiple levels of feature abstraction.

13. *Inhibitory repetition effects: Opposing influences of event updating and new event encoding*
Maria C. D'Angelo, Chenzhe Jimmy Qiu, Fredo L. Zavarella, Bruce Milliken, McMaster University

Although there has been speculation that spatial negative priming and inhibition of return (IOR) may have the same cause (Christie & Klein, 2001; Milliken, Tipper, Houghton & Lupianez, 2000), non-spatial forms of negative priming are typically attributed to processes unrelated to IOR. We describe a series of experiments that highlight a functional similarity between the role of probe distractors in studies of non-spatial negative priming, and neutral cue-back events in studies of IOR. The results are interpreted within a two-process framework in which opposing influences of event updating and new event encoding play a central role.

ICT114

Papers: Language and Reading
Moderator: Murray Singer, University of Manitoba

14. *Validation during reading: An individual differences analysis*
Murray Singer, Jeffrey C. Doering, University of Manitoba

We explored the impact on reading time of the truth and polarity (affirmative or negative expression) of the current text segment relative to its antecedents. For the first time, we also asked whether (a) reading skill, and (b) working memory resources, as indexed by the reading span task, impact readers' sensitivity to the congruence among text ideas. Only reading skill interacted with truth and polarity: High-skill readers were sensitive to both text congruence and subtle pragmatic text features whereas low-skill readers seemed to monitor only the former. The results are accommodated Singer's (2006) validation model with the added assumption that low-skill readers are less affected by pragmatic violations.

15. *Reading aloud: Interactive activation reconsidered*
Serje Robidoux, Macquarie University; Derek Besner, University of Waterloo

It is a received idea that language processing is best characterized as one of interactive activation. Curiously, the central assumption that between level feedback plays an important role in, for example, reading aloud, has received little critical attention. A series of simulations with a prominent model demonstrate that the effect of feedback is (a) remarkably small when present, (b) is not as widespread as standardly assumed (various levels produce no effect of feedback on performance) and (c) leads to many errors when feedback strength is increased. We conclude that the field has over-emphasized the importance of feedback when reading aloud.

16. *The development of gender-differentiated speech in adolescence*
Giancarlo Diano, Amanda Ward-Sutherland, Fangfang Li, University of Lethbridge

The differences between men and women's speech can be due to anatomical structural variations or differentiated social construct of gender identity. In this study, we attempt to disentangle the relative contribution of different factors in the production of the 's' sound (as in sea). Forty eight participants aged from 10 to 16 took part in a speech production experiment. Their speech were recorded and analyzed acoustically. In addition, their physical sizes were measured and gender typicality was assessed through a parental report. The results indicate a stronger effect of gender identity in the production of gender-differentiated 's'.

17. *The effect of bilingualism on lexical ambiguity processing in older adults*
Shanna Kousaie, William Deller, Vanessa Taler, University of Ottawa

Inhibitory control is thought to decline with age, and bilingualism has been associated with spared cognitive function (including inhibition) in aging. The present investigation examines lexical ambiguity processing (homonyms, e.g., pen, meaning , “writing implement” or “enclosure”), which relies on inhibition for the selection of the contextually appropriate meaning, in older monolingual (n=13) and bilingual (n=14) adults using behavioural and electrophysiological measures. Preliminary analyses revealed an Appropriateness x Language Group interaction, showing that bilinguals selectively activated the appropriate meaning of the homonym, whereas monolinguals did not. These findings suggest language group differences in lexical ambiguity processing in older adults.

ICT116

Papers: Memory 1
Moderator: Chris Oriet, University of Regina

18. *Absolute and relative judgments of similarity yield different fillers in eyewitness lineups*
Chris Oriet, Ryan J. Fitzgerald, University of Regina

In selecting fillers to appear in an eyewitness lineup, researchers typically choose fillers whose similarity to the suspect has been evaluated by independent raters. Normally, raters are simply shown a photograph of the suspect paired with another photograph and asked to rate the similarity on a Likert scale between the people pictured; that is, an absolute judgment of similarity is required. Here, we show that different fillers would be chosen if similarity was instead judged using an easier relative judgment task in which two fillers are paired with the suspect and raters choose the more similar filler.

19. *Forced-choice recognition: Processes and strategies*
Douglas J. K. Mewhort, Elizabeth Johns, Queen's University

In forced-choice recognition, Tulving (1981) reported higher accuracy when the target and distractor were derived from the same studied item (A-A') but higher confidence when the target and distractor were derived from different studied items (A-B'), prompting Clark's (1997) model of forced-choice recognition. We report a situation where accuracy was higher in the A-B' condition than the A-A' condition. We argue that the A-A' condition highlights which details are pertinent, while the A-B' condition allows correct decisions if either the A or B item is remembered. Neither of these conflicting factors is compatible with Clark's account.

20. *Context effects on recognition judgments are modulated by the judgment options*
Cody Tousignant, Glen E. Bodner, University of Calgary; Michelle Arnold, Flinders University

We explored how context effects on recollection and familiarity recognition judgments are modulated by the judgment options at test. A critical set of words were studied and tested with shallow or deep encoded words. Participants then classified their recognition experiences as either 1) recollect or familiar, 2) recollect, familiar, or guess, or 3) recollect, familiar, or both. Recollection judgments for critical words were affected by context except when a guess option was provided, whereas familiarity judgments were affected only in the first condition. The “both” condition provides an alternative to collecting independent ratings of recollection and familiarity.

21. *Metamemory for emotional words*
Kathleen L. Hourihan, Memorial University of Newfoundland

Emotional words are generally recalled better than neutral words. Emotional content can be specified along two dimensions: valence and arousal. Researchers examining memory for emotional words generally allow valence and arousal factors to co-vary in selecting stimuli. The present study aimed to provide a systematic comparison of how valence and arousal contribute independently and interactively to both memory and metamemory. In Experiment 1, valence (holding arousal constant) influenced both recall predictions and performance; in Experiment 2, arousal (holding valence constant) influenced recall predictions but not performance. Experiment 3 explored the interactive influences of valence and arousal on memory and metamemory.

SYMPOSIA AND PAPERS 2 - SATURDAY, JUNE 8 (2:45-3:45)

ICT121

Papers: Attention 1
Moderator: Tom Spalek, Simon Fraser University

22. *A novel paradigm reveals the role of reentrant visual processes in object substitution masking*
Ali Jannati, Thomas S. Spalek, Vincent Di Lollo, Simon Fraser University

Object-substitution masking (OSM) occurs when a combined display of target and mask continues with the mask alone, creating a mismatch between the reentrant hypothesis triggered by the initial display and the ongoing low-level activity. We show that the critical factor in OSM is not whether the mask remains on view but whether the representation of the mask is sufficiently stronger than that of the target when the reentrant hypothesis arrives. We inserted a variable blank period (ISI) between the initial display and a brief trailing mask. As predicted, OSM occurred at intermediate ISIs, but not at short or long ISIs.

23. *Looking for the key to inhibition of return in everyday search*
Janice J. Snyder, University of British Columbia, Okanagan Campus; Walter F. Bischof, University of Alberta

We studied whether inhibition of return (IOR) generalizes from typical stimuli used in laboratory stimuli to settings that are closer to everyday search reality. We also investigated whether IOR varies in magnitude when the search is successfully completed (i.e., the target is detected) vs. when search is interrupted. Participants searched 96 unique photographed indoor/outdoor scenes for a key hidden under one of the objects by executing mouse-clicks over the object(s). A probe-detection task revealed IOR of equal magnitude at searched locations regardless of whether the search was completed or interrupted. These results shed new light on the mechanisms underlying IOR.

24. *A gaze in the crowd: Social attention is resilient to perceptual load*
Dana A. Hayward, Jelena Ristic, McGill University

Although social attention is a robust phenomenon the nature of the implicated attentional mechanisms remains unknown. We investigated whether social orienting is affected by perceptual load, which is known to disrupt automatic attention. We paired a social cuing task with different levels of perceptual load and found that social attention was unaffected by these manipulations. Taken together with the data showing resilience of social attention to cognitive load, which is known to disrupt voluntary attention, our data indicate that attending to gaze direction engages a unique form of attention.

25. *Is F>R IOR in item method directed forgetting a selective modulation of the motoric flavour of IOR?*
Kate M. Thompson, Tracy Taylor, Dalhousie University

In item-method directed forgetting, there is a greater magnitude of inhibition of return (IOR) after F compared to R instructions (F>R IOR). Here we test the hypothesis that this reflects an exclusive modulation of the motoric flavour of IOR. Words were presented peripherally, each followed by an R or F instruction, then a target was localized either with a saccade (E1) or a manual response (E2). We observed F>R IOR in both E1 and E2. These results suggest that F>R IOR is not exclusively motoric since it was observed even when no occulomotor movements were required.

ICT122

Papers: Human/Cognitive Neuroscience 1
Moderator: Aiden Arnold, University of Calgary

26. *An fMRI study of age-related differences in complex object discrimination*
Lee Ryan, Jose Cardoza, University of Arizona

Previous studies have shown reduced object discrimination in rats, monkeys and human patients with perirhinal damage. Aged rats are also impaired on complex object discrimination, but no studies have addressed this issue in aged humans. We compared older and younger adults on object matching. While some older adults scored similarly to young adults, a subgroup of older adults were impaired on object matching. fMRI activation in perirhinal cortex was observed for younger adults and high performing older adults, but significantly less for impaired older adults. These results suggest that complex object discrimination is impaired in some, but not all older adults, depending upon the degree of perirhinal cortex engagement.

27. *Slot machine gambling: can monetary losses make you play longer?*
Candice Graydon, Mike J. Dixon, Kevin A. Harrigan, Jonathan A. Fugelsang, Madison Stange, Irene Chhay, University of Waterloo

On modern multiline slot machines, many small wins are actually monetary losses (e.g., bet $1, win back $0.50). Nevertheless, these losses disguised as wins (LDWs) are accompanied by potentially reinforcing audio-visual feedback. We previously showed that novices physiologically (Dixon et al., 2010) and psychologically (Jensen et al., 2013) miscategorize LDWs as wins. Here, we extend these findings, showing that games with many LDWs encourage novices to gamble (voluntarily) for longer than games with fewer LDWs, despite both games having identical payback percentages and numbers of actual wins. We conclude that LDWs, despite being monetary losses, encourage prolonged slot machine play.

28. *Only in close range: Modulating visuospatial attention deployment with stimulus similarity*
Sébrina Aubin, Pierre Jolicoeur, Université de Montréal

Shape similarity and physical distance are two factors that have previously been shown to individually modulate the amplitude of the N2pc, an event-related potential component reflecting mechanisms of visuospatial attention deployment. Here, we found an interactive effect between shape similarity and the distance between salient stimuli on the N2pc. The amplitude of the N2pc was significantly reduced when the similarity between a target shape and a distractor shape was decreased, but only when the salient stimuli were spatially next to each other. This interaction reveals the operation of a local feature-filtering process that operates at a fine spatial scale.

29. *How spatial multiplexing solves Information bottlenecks in central nervous systems*
Thomy Nilsson, University of Prince Edward Island

Geometry limits how much information can enter or leave any processor's surface. Computers overcome these bottlenecks by temporal multiplexing, but biological systems are too slow. Therefore small brains could never obtain enough information to warrant larger brains to operate larger bodies. We explain how a certain convergent-divergent neural network provided enough spatial multiplexing for vertebrates to overcome this bottleneck. This enabled vertebrates to 1) input more information into small brains; 2) economically circulate that information; 3) output enough information to control larger bodies. Recognition of spatial multiplexing may help us understand how information is transmitted and distributed within the brain.

ICT114

Symposium: Further Examination of Math Cognition in Children
Chair: Michelle Drefs, University of Calgary
Abstract: The past decade has witnessed considerable growth in the study of math cognition in children. This session extends this discussion by examining both cognitive and basic (precursor) numeracy skills that contribute to children's development and understanding of mathematics; as well as methods for best supporting its development. Specific topics to be addressed include: (a) motivational characteristic differences between procedural and conceptual fraction math learners, (b) the nature and role of metacognition in young math learners, (c) bridging competencies between non-symbolic numerosity knowledge and symbolic number systems, and (d) the implications of tablet computer use in promoting mathematical understanding in children.

30. *Short-term gains in early numeracy skill: Mapping quantitative to symbolic representations*
Jo-Anne LeFevre, Kristina Dunbar, Aala Ridha, Carla Sowinski, Claire Xu, Emma Wells, Carolina Jimenez Lira, Carleton University

Preschool children played numeracy games over six weeks (n = 70; M = 45 months). The linear game was a path from 1 to 20. The rows game was in two aligned segments, 1-10 and 11-20. The control group counted. Rote counting improved more for children in the row than in the linear or control groups. Improvements in cardinality were predicted by pretest non-symbolic arithmetic and rote counting. Participation in the number games also predicted improvements in cardinality. These findings support the view that children's ability to mentally represent and manipulate small quantities is an important precursor ability for numeracy.

31. *Exploring the role of metacognition in young children's math development*
Michelle Drefs, University of Calgary

While empirical support for the importance of metacognition on academic achievement continues to mount, few studies have examined metacognitive skills in relation to young children's math development. The purpose of this presentation is to review the impact of an eight-week intervention program targeting grade one students' (47 experimental, 37 control) metacognitive abilities. Initial results found no differences between groups, with both groups achieving increased math and metacognitive scores at the conclusion of the 8-week period. The focus of this presentation is on follow-up data collected one year later, with implications for the assessment and intervention of metacognitive skills discussed.

32. *Can tablet computers facilitate children's understanding of mathematics*
Adam Kenneth Dubé, Rhonda N. McEwan, University of Toronto

Schools are adopting tablet computers at a rapid rate. Yet, the effectiveness of tablet computers as learning tools for young children has not been tested. In the present study, children (n = 36) from Kindergarten, Grade 1, and Grade 2 used three mathematics learning applications on one of four tablet computers and completed working memory and attention tasks. Ability to successfully use the tablet, engagement with each application, and the purposefulness of the interaction were measured. The goal is to model child-computer interaction so that both the cognitive ability of the child and the affordance and limitations of tablet computers are considered.

33. *Motivational characteristic differences between procedural and conceptual fraction learners*
Aishah Bakhtiar, Darcy Hallett, Cheryll L. Fitzpatrick, Memorial University of Newfoundland

Research concerning fraction ability suggests that both procedural and conceptual understanding are important for learning fractions (Hallett, Nunes, Bryant, & Thorpe, 2012; National Mathematics Advisory Panel, 2008). No research to date, however, has looked at whether conceptual or procedural knowledge are differently related to academic motivational variables. In this study, procedural and conceptual learners were examined on three motivational variables: i) self-concept; ii) self-attribution; and iii) goal-orientation. The data suggest that the two types of learners can be differentiated based on motivations, with correlational analyses demonstrating differences in attributional styles, verbal self-concepts, and performance-orientations.

ICT116

Symposium: The Effects of Production on Memory
Chair: Glen E. Bodner
Abstract: The production effect refers to a memory advantage for items read aloud over items read silently. This symposium describes a between-subjects version of the effect, considers whether the within-subject effect reflects a benefit for aloud items and/or a cost for silent items, examines encoding factors that enhance the production effect, and investigates the role of attention during encoding.

34. *Evaluating the basis of the between-subject production effect*
Alexander Taikh, Glen E. Bodner, University of Calgary

The production effect refers to enhanced memory for words studied aloud over words studied silently. We compared retrieval (distinctiveness) and encoding (memory strength) accounts of a robust between-subject production effect in recognition. We tested whether this effect is eliminated by 1) salient within-subject encoding manipulations (generation and imagery) and/or 2) a source-judgment test. Our results challenge both accounts,

but fit better with a modified strength account than a modified distinctiveness account. On the former account, participants base their recognition decisions on strength evaluation unless the test situation leads them to base their decisions on recollection of the salient within-subject manipulation.

35. *The benefits and costs of production*
*Noah D, Forrin, Brianna Groot, Colin M. MacLeod, University of Waterloo

The production effect typically has been more robust in a within-subject (i.e., mixed-list) design than in a between-subjects (i.e., pure list) design. This larger within-subject effect may reflect benefits to reading aloud in a mixed list, costs to reading silently, or both benefits and costs. To assess these benefits and costs, we employed a blocked design in which participants studied three lists: pure aloud, pure silent, and mixed (with a recognition test following each list). The results indicate that production leads to both benefits and costs in a mixed list, consistent with a distinctiveness account and perhaps with lazy reading.

36. *The effects of divided attention at encoding*
Brandon J. Slaney, Kathleen L. Hourihan, Memorial University of Newfoundland

The production effect arguably occurs as a result of the enhanced distinctiveness at encoding for produced items. The current study examined whether participants need full attention to encode this distinctive information, or whether the information is still automatically encoded under divided attention conditions. Participants studied a list of words (half Aloud and half Silent) in either a full or divided attention condition. Although recognition accuracy was slightly reduced in the divided attention group, a significant production effect was observed in both groups. The distinctive "said it aloud" information that underlies the production effect appears to be encoded automatically.

37. *Enhancing the production effect in memory*
*Chelsea Quinlan, Tracy Taylor, Dalhousie University

The current literature demonstrates that reading aloud is the most effective form of production; however, the distinctiveness account suggests that other forms of vocal production that include an additional distinct element should produce an even greater production effect. In three experiments, we found that reading items aloud loudly and singing items at study resulted in a greater production effect than reading items aloud in a normal voice, with the largest benefit for singing. Our findings support the distinctiveness hypothesis by demonstrating that other forms of production can have a more pronounced effect on subsequent memory than reading aloud at study.

SYMPOSIA AND PAPERS 3 - SATURDAY, JUNE 8 (4:00-5:00)

ICT121

Symposium: Embodied Cognition
Chair: Penny M. Pexman, University of Calgary
Abstract: In recent years, there has been growing interest in the Embodied Cognition framework. By this account, cognitive processes are grounded in bodily states and interactions with the environment. In this symposium each set of presenters will describe investigations that test and extend the embodied cognition framework. The studies described assess the role of action and sensorimotor information in perceptual, conceptual, and language processing. Results of these investigations include both behavioral and neuroimaging data, and provide new insights about the ways in which cognition may be embodied.

38. *Embodied comprehension of sentences*
*Alison W. Heard, Michael E. J. Masson, Daniel N. Bub, University of Victoria

To investigate the nature of hand action representations evoked during language comprehension subjects listened to sentences describing a functional (use) or volumetric (move) interaction with an object while viewing four hand postures. Two postures corresponded to functional and volumetric actions relevant to the mentioned object and the other two were relevant to an unrelated object. The time course of eye fixations on the postures as the context sentence unfolded provided information about the nature of hand action representations evoked by

sentence comprehension. Evidence was found for selection of the contextually relevant action representation and for suppression of a competing representation.

39. *Effects of emotional, motor, and sensory information in abstract and concrete word processing*
Paul D. Siakaluk, Michael Moffat, Nathan A. Knol, Kaleigh L. Pelletier, University of Northern British Columbia

According to Vigliocco et al.'s (2009) theory of semantic representation, emotional knowledge underlies the meanings for abstract words, whereas motor and sensory knowledge underlies the meanings for concrete words. We used the dimensions of emotional experience, body-object interaction, and imageability to measure emotional, motor, and sensory knowledge, respectively. We predicted that emotional experience should facilitate processing in semantic categorization and inhibit processing in Stroop for abstract words, whereas body-object interaction and imageability should facilitate processing in semantic categorization and have null effects in Stroop. The results we report are largely consistent with these predictions.

40. *'How would YOU interact with this?' FMRI BOLD activation during overt semantic generation to action-related pictures and words*
Carrie Esopenko, University of Toronto; Layla Gould, University of Saskatchewan; Jacqueline Cummine, University of Alberta; Gordon E. Sarty, University of Saskatchewan; Naila Kuhlmann, University of Saskatchewan; Ron W. Borowsky, University of Saskatchewan

We used fMRI to examine shared versus unique regions of activation between an ecologically-valid overt semantic generation task and a motor task in the parietal-frontocentral network (PFN), as a function of stimulus format (pictures, words) and effector type (hand, foot). Shared activation between the semantic generation and motor tasks was organized somatotopically in the PFN, and unique activation for the semantic generation tasks occurred in proximity to the hand or foot motor cortex. These results further elucidate embodied cognition by showing that brain regions activated during actual motor movements were also activated when an individual verbally generates action-related semantic information.

41. *Tongue tied: Suppressing articulation decreases the bouba/kiki effect*
*David Michael Sidhu, Penny M. Pexman, University of Calgary

The Bouba/Kiki Effect (Köhler, 1947; Ramachandran & Hubbard, 2001) is the tendency to pair nonwords containing rounded vowels and/or continuant consonants with rounded shapes, and nonwords containing unrounded vowels and/or stop consonants with jagged shapes. In the present study we investigated the role of embodied experience. We found that suppressing the simulation of 'sharp' articulations served to decrease the association between 'sharp' nonwords and congruent shapes, while having no effect on 'round' nonword pairings. Preventing the experience of 'sharp' articulations also appeared to make 'neutral' nonwords appear more round. These findings support the role of articulation in the Bouba/Kiki effect.

ICT122

Papers: Memory 2
Moderator: Randall Jamieson, University of Manitoba

42. *How similar is too similar? Establishing the upper bounds of eyewitness lineup similarity*
*Ryan J. Fitzgerald, Chris Oriet, Heather L. Price, University of Regina

Good eyewitness lineups contain one person suspected of the crime and a set of fillers (known innocents). We used face-morphing software to manipulate the extent to which fillers resembled the suspect. After viewing a culprit on video, participants (N = 137) tried to identify him from a photographic lineup. The identity of the suspect (culprit vs. innocent suspect) and suspect-filler similarity (high vs. very high) were manipulated across participants. Among those who identified a lineup member, increases in suspect-filler similarity reduced both culprit and innocent suspect selections. Thus, fillers who strongly resembled the suspect yielded costs and benefits.

43. *Modulatory effect of 17-β estradiol on performance of ovariectomized rats on the Shock-Probe task*
Nicole J. Gervais, Sofia Jacob, Megan Barrett-Bernstein, Wayne G. Brake, Dave G. Mumby, Concordia University

The objective of the present study was to investigate the modulatory effect of *17-β* estradiol (E2) in fear conditioning using the Shock-Probe task. Ovariectomized (OVX) rats either received high chronic E2 replacement (OVX-E2), no E2 replacement (OVX-Vehicle), or a no shock, no E2 replacement (OVX-Naïve). OVX-Vehicle and OVX-E2 groups demonstrated fear conditioning to the probe and context as they showed more fear behaviour than the OVX-Naïve group during acquisition. During the 24-hr retention test, only the OVX-E2 group demonstrated retention of the acquired fear, suggesting E2 modulates consolidation and/or retention of the acquired context-shock and/or probe-shock associations.

44. *False recognition of instruction-set lures*
*Evan T. Curtis, Chrissy M. Chubala, Jackie Spear, Randy K. Jamieson, University of Manitoba; William E. Hockley, Wilfred Laurier University; Matthew J. C. Crump, Brooklyn College, City University of New York

We examined the false recognition of words presented in task instructions as example items (i.e., instruction-set lures). False alarm rates were higher to instruction-set lures than to standard lures. The effect was reduced but not eliminated when participants were warned about the lures. The effect was also reduced but not eliminated when the instruction-set lures were subtly included as words within the task instructions. In contrast, the effect was eliminated when the instructions were presented verbally. We frame the results as a failure of context to constrain memory search and discuss implications for formal models of memory.

45. *Less is more? The influence of the number of available features on the encoding of geometry in virtual environments*
Althea Ambosta, Debbie M. Kelly, University of Manitoba

Is the implicit encoding of geometry influenced by the number of features available during initial learning? In the current study adults were trained to select one corner of a parallelogram-shaped virtual environment that contained either three or four distinct features at any one time. During testing in featureless environments, we examined whether participants could orient using either wall length or angles alone, as well as which of these cues they would rely upon when the cues provided conflicting information. Here we discuss the influence of the number of available features on the use of different strategies for encoding geometry.

ICT114

Papers: Animal Neuroscience
Moderator: Evan Balaban, McGill University

46. *A new test of object-recognition memory for rats*
*Emily Cole, Sarah C. Huxley, Julia C. Munden, Dave G. Mumby, Concordia University

Object-recognition consists of the ability to detect the familiarity of previously encountered objects. The novel-object-preference (NOP) test is the most commonly used test to assess object-recognition memory in rats. Recent evidence, however, casts doubts on the internal validity of the NOP test. The goal of the present study was to develop a new test of object-recognition memory. The new method incorporates the appetitive-reward and explicit choice aspects of the delayed nonmatching-to-sample task. Results indicate that rats are able to reach high levels of performance following only a short period of training. The results from this new task confirm its utility as a test of object-recognition memory.

47. *Prenatal activation of orexinergic neurons*
Maria Pompeiano, Ahn Lee, Kyle E. Godden, McGill University

Wakefulness is maintained by the activity of orexinergic, monoaminergic and cholinergic neurons. While these systems differentiate during embryonic development, waking appears only after birth (based on prenatal EEG and behavioral observations in lambs and chickens). However, recent PET studies indicate that chick embryos can show waking-like brain metabolic patterns before hatching. Here, we found increases in the spontaneous activity of

orexinergic neurons (indicated by cFos expression) in the developing chick embryo. This suggests an important developmental role for orexinergic neurons producing functional prenatal changes in waking brain circuitry.

48. *Noninvasive molecular imaging demonstrates waking-like brain states in bird embryos*
Evan Balaban, McGill University

Complex learning requires wakefulness, yet previous research on chicken and sheep embryos indicated that waking states first appear after birth. This question was re-examined using Positron Emission Tomography (PET) in chick embryos during the last 30% of prenatal life. During imaging, embryos were stimulated with either a biologically-salient sound, an acoustically similar but non-biologically-salient control sound, or unstimulated, and embryo behavior and cardiac responses were recorded non-invasively from the eggshell; developmental age was standardized using skeletal morphology measured with CT. Waking-like brain function is present in a latent but inducible state during the final 20% of embryonic life.

49. *Effects of maternal stress and perinatal fluoxetine exposure on behavioural outcomes of adult offspring*
*Veronika Kiryanova, Sara Iablokova, Richard Dyck, University of Calgary

The present study investigated the effects of maternal stress and perinatal exposure to the SSRI fluoxetine on the behaviour of male and female mice as adults. METHODS: Mouse dams were perinatally exposed to chronic unpredictable mild stress and/or fluoxetine. At two months of age, the male and female offspring went through a comprehensive behavioral test battery. RESULTS: Perinatal stress and fluoxetine exposure, separately and in combination, lead to behavioural changes in male and female offspring. The results of the current study were sex specific and may indicate differential actions of prenatal stress and fluoxetine on male and female mice.

ICT116

Papers: Perception 1
Moderator: Ena Vukatana, University of Calgary

50. *Beyond fear: Exposure to angry and surprised faces enhances early visual perception*
Steve Perrotta, Sabina Caliciuri, Mark Wachowiak, Jeff Nicol, Nipissing University

West et al. (2010) hypothesized that exposure to emotional expressions with varying contrast of the eyes may modify early visual perception. We tested this hypothesis using facial expressions of anger and surprise. 30 undergraduates completed an orientation discrimination task following exposure to these faces. Examination of the main effect of emotion revealed that both angry and surprise facial expressions enhanced visual perception for low spatial-frequency targets more than neutral expressions. This enhancement following exposure to angry as well as surprised faces suggests that the contrast of the eyes is sufficient but not necessary in modifying early visual perception.

51. *Determinants of External Normalization*
Timothy Dunn, University of Manitoba

Individuals often use their bodies when engaged in various cognitive activities, arguably, in order to simplify the internal computations involved. This behavior of foregoing internal processing for external processing is often referred to as cognitive offloading. In the present investigation we focus on one such behavior, external normalization, wherein individuals rotate their heads when trying to identify a rotated object. Previous research has demonstrated that the frequency of this behavior increases as the number of elements in the display increases. The current study focuses on the perceptual cues within multi-element arrays that influence the decision to physically rotate.

52. *Humans show relative rule-based encoding of obtuse geometric angles*
James F. Reichert, Debbie M. Kelly, University of Manitoba

Prior research has shown that humans use an absolute encoding pattern for discriminating among smaller acute geometric angles than larger acute angles. The goal of the current research was to determine whether the same

pattern exists for obtuse angles. Three geometric angles were positioned equidistant from each other inside an experimental room and people were trained to find a reward hidden near only one. During non-reinforced testing trials the training angle (110°, 135° or 165°) was paired with one of a series of smaller and larger novel test angles. Results showed relative encoding for all training angles regardless of size.

53. *Gestural actions hold and direct visual attention*
Afra Foroud, University of British Columbia; Raymond M. Klein, Aaron J. Newman, Gail A. Eskes, Dalhousie University

This study examined how gestural actions direct visual attention. Participants identified the colour of a target presented at a range of SOAs to the left or right of a model performing leftward, rightward or neutral gestures and posture/no motion. Performance was slowed at early SOAs when gestures were still occurring in the neutral conditions. For the left/rightward cues, an attentional asymmetry was found after motion offset. RTs were faster on incongruent trials of the leftward cue and on congruent trials of the rightward cue. Discussion will centre on how motion can hold and direct attention and on the role of visual attention during gestural actions in face-to-face interactions.

SYMPOSIA AND PAPERS 4 - SUNDAY, JUNE 9 (9:30-10:30)

ICT121

Papers: Attention 2
Moderator: Mark Huff, University of Calgary

54. *The role of meaning in colour-word contingency learning*
Olivia Y.H. Lin, Colin M. MacLeod, University of Waterloo

Contingency learning refers to the implicit learning of relations between events. In the typical colour-word contingency study (Schmidt et al., 2007), three words are presented in three different colours with each word presented 80% of the time in one colour (high contingency) and 10% of the time in each of the remaining colours (low contingency). High contingency items are responded to faster than low contingency items. However, the size of the contingency effect is not influenced by whether the words are semantically related or unrelated. We show that meaning does not influence learning of colour-word contingencies.

55. *Semantic priming in change detection*
Mitchell R. LaPointe, Nabil Khaja, Bruce Milliken, McMaster University

Evidence from change detection tasks has shown that objects that are incongruent with a scene's context are detected faster than those that are congruent. This finding is curious given a congruent scene constrains the probability of expected objects. In these experiments, we attempted to induce the use of the congruent context by presenting an image or word of the target object or scene, prior to a change detection task. We found that incongruent objects were detected faster than congruent objects, however, the magnitude of the benefit depended on the type of prime used (image vs. word).

56. *Exploring the role of context on episodic memory retrieval during mind wandering behaviour*
Melaina T. Vinski, Jonathan Smallwood, Scott Watter, McMaster University

Associative Network Theory predicts that environmental context enhances the accessibility and retrieval of congruent memories from long term memory. The role of context on the retrieval of episodic memories during mind wandering behaviour remains unexplored. The current work uses the semantic Sustained Attention to Response Task to investigate whether the active (Experiment 1) and passive (Experiment 2) processing of neutral, positive and negative stimuli influence the frequency and content of mind wandering episodes. In both experiments, processing negative information diminished task-oriented attention and induced a retrospective bias during mind wandering episodes, with reported negative mood accounting for the temporal bias.

57. *Context in cognitive control*
Alex W. Gough, Jesse Garcia, Bruce Milliken, McMaster University

Recent research using attentional filtering tasks has shown that cognitive control is often quite specific to particular contexts (Fernandez-Duque and Knight, 2008; Crump, Gong and Milliken, 2006). This type of context-specific control has yet to be demonstrated in spatial orienting tasks. In the present study, participants located targets that followed exogenous spatial cues. The proportion of targets that appeared at cued locations was varied separately across distinct spatial (top or bottom) or temporal (short or long SOA) contexts. The results indicated that spatial and temporal contextual cues together, but not separately, produced context-specific control over exogenous orienting effects.

ICT122

Papers: Human/Cognitive Neuroscience 2
Moderator: Jim Enns, University of British Columbia

58. *Ignorance is avoidance: ERP evidence for obstacle suppression during reach avoidance*
Craig S. Chapman, University of Alberta; Grace Truong, Javier Granados-Samoyoa, Thariq Badiudeen, James T. Enns, University of British Columbia

When reaching for objects in cluttered environments we must select targets and avoid obstacles. Previous work using visually evoked potentials (VEPs) recoded with electroencephalography (EEG) shows that visuomotor attention is directed to upcoming target locations (Baldauf & Deubel, 2009). In the current set of EEG studies using real reach-to-grasp movements, we replicate the enhanced VEPs at target locations and show reduced VEPs at obstacle locations, suggesting that visuomotor attention is suppressed to avoid obstacles. This fits a theoretical framework where, over time, objects compete for action selection, are selected and finally are suppressed if they interfere with the intended movement.

59. *Is the hand's automatic pilot sensitive to the frequency of a target jump?*
Megan S. Howe, Chris L. Striemer, Grant MacEwan University

Previous research has suggested that the dorsal visual stream possess an automatic pilot that adjusts our movements online in response to changes in target position. We examined the extent to which participants could disengage the automatic pilot by manipulating the frequency of a target jump (i.e. 70% vs. 30%), as well as task instructions to correct (i.e. Go), or ignore a target jump (i.e. NoGo). Our results indicated participants were easily able to make corrections in the Go task, but were not able to prevent themselves from making corrections in the NoGo task, regardless of how frequently the target jumped.

60. *The effect of context on recognition of objects*
Mathieu B. Brodeur, Melissa Maguire, Maria Bouras, McGill University

Recognition of objects is largely influenced by contextual surrounding. To receive insight into the brain activities underlying this context effect, event-related potentials (ERPs) to 20 subjects were recorded while recognizing ambiguous and non-ambiguous objects appearing in consistent and inconsistent scenes. ERPs to non-ambiguous objects were unaffected by context consistency. ERPs to ambiguous objects in consistent scenes were similar to those of unambiguous objects whereas those to ambiguous objects in inconsistent scenes were significantly different over the frontal and posterior areas. Context therefore alters the recognition process of ambiguous objects by bringing it close to that of the non-ambiguous objects.

61. *Observational motor learning as a function of the expertise in a slicing task*
Margarita V. Maltseva, Liana E. Brown, Trent University
NOTE: This presentation is now the last poster in Poster Session 2.
Do people learn by observing errors (novices) or experts? We addressed this question with a slicing task. After we assessed their initial knife skills, participants watched a video of an expert (chef) or a novice model slicing a potato, or a control video. Slice time, accuracy, and variability were measured pre- and post-observation. We found improvements in slice accuracy and variability only in participants who observed the novice model, consistent with

research suggesting that people learn by observing errors. Our initial analyses of observer expertise indicate that participants may learn best when the model's skill level is near their own.

ICT114

Papers: Animal Behavior
Moderator: Mark Cole, Huron University College

62. *Wall colour-geometry associations in a kite box*
Mark Cole, Huron University College

Rats explored a kite box to form an association between wall color and corner shape with no food present. Then, corner shape in a kite box (Experiment 1) or wall color in a square box (Experiment 2) provided the only cue to the location of food. Probe trials, without food, and wall colour the only cue in a square box (Experiment 1) or shape the only cue in a kite box (Experiment 2) showed that rats followed wall color (Experiment 1) and corner shape (Experiment 2). The results explain the frequent finding that wall colour potentiates shape in kite boxes.

63. *Parallel mathematical descriptions of spatial behaviour in human infants and rats*
Farshad Nemati, University of Lethbridge

In Piaget's view, spatial behaviour of human infants represents "logico-mathematical" structures even before acquisition of language. According to such view, the pattern of path finding during infancy implies developmental construction of the "group of displacements" which was described by French mathematician Henri Poincare to be related to the organization of space. It will be demonstrated that such mathematical structures that describe the spatial behaviour of human infants can also be inferred from rats' spatial behaviour. The agreement on the mathematical description of spatial behaviour will be discussed in relation to the process of abstraction in humans and rats.

64. *To cache or not to cache: do Clark's nutcrackers protect their caches in cooperative contexts?*
Dawson Clary, Debbie M. Kelly, University of Manitoba

Clark's nutcrackers cache food to survive periods of resource uncertainty. However, these caches are at risk of being stolen by other birds, therefore nutcrackers and other corvids have evolved cognitive-based cache protection strategies that minimize the risk to their caches. Previously, nutcrackers were shown to suppress their caching in the presence of conspecifics and to preferentially recover their caches when an observer was knowledgeable of the cache locations. Here, we present the birds with a cooperative caching task to examine whether the nutcracker's cache protection strategies are dependent on the nature of the social context in which they cache.

65. *Not all effort is equal: Anterior cingulate cortex and effort-based decisions*
*Victoria Holec, David R. Euston, University of Lethbridge

Effort decisions are cost-benefit decisions in which the cost constitutes physical effort. Rats with anterior cingulate cortex (ACC) lesions show impairments on an effort ramp-climbing task (Walton et al., 2002). We asked whether this finding extrapolates to 1) other kinds of physical effort, and 2) courage effort. Results indicate that ACC does not mediate physical effort on a novel weight-lifting task, possibly due to the task nature. ACC damage also does not impair mental effort on a novel courage task as predicted. This suggests a more complex role of ACC than previously thought.

ICT116

Symposium: Numerical Cognition: Memory Processes in Mental Arithmetic, Number Comparison, and Ordinality
Chair: Jo-Anne LeFevre, Carleton University
Abstract: Numerical processes are ubiquitous in many aspects of life. Research on arithmetic and number comparison has provided many useful insights into the representation and processing of numerical information

and contributes more generally to understanding conceptual and procedural knowledge in mathematics. The presenters in this symposium will describe exciting new developments in the field, exploring retrieval-induced forgetting, the role of visual memory in mental arithmetic, contributions of eye-tracking data to understanding differences across operations, and contrasting comparison and ordinality tasks with symbolic and non-symbolic stimuli.

66. *Retrieval-induced forgetting of arithmetic facts but not rules*
Jamie Campbell, Nicole H. Therriault, University of Saskatchewan

University students (n = 40) practiced rule-governed multiplication problems (e.g., 1 × 5, 0 × 4) and multiplication facts (e.g., 2 × 5, 3 × 4) for four blocks and then were tested on the addition counterparts (e.g., 1 + 5, 0 + 4, 2 + 5, 3 + 4) and control additions. Increased addition RT and errors relative to controls occurred only for problems corresponding to multiplication facts, with no problem-specific effects on addition counterparts of rule-based multiplications. In contrast, the rule-governed 0+N problems showed evidence of generalization of item-specific practice, whereas the fact-based 1+N problems did not. Adults' performance of arithmetic rules and facts is governed by distinct memory representations and processes.

67. *Measuring the working memory requirements of mental arithmetic*
Thomas Faulkenberry, Sarah Montgomery, University of Texas

Many studies have implicated a role for working memory in mental arithmetic. However, the picture for visual working memory has been less clear. In this research we used a multinomial probability model (Cowan, 2001) to measure visual working memory capacity in two conditions. In the first condition, participants responded to a change-detection task involving remembering colors of squares on a screen. In the second condition, a vertically-presented arithmetic problem was used as a load task in between the study and test conditions. We found that capacity measures were significantly smaller when the arithmetic problem was featured, indicating that the arithmetic problem "used up" quite a bit of the available working memory capacity. Furthermore, problem difficulty played a role: problems involving a "carry" required almost exactly one more slot, indicating that the carry process in mental arithmetic may require visual codes.

68. *Eye tracking and simple arithmetic: The influence of problem size on fixation patterns across four operations*
Matthew G. Huebner, Carleton University; Evan T. Curtis, University of Manitoba; Jo-Anne LeFevre, Carleton University

Eye tracking has rarely been used to study arithmetic problem solving. In the present research, adult participants solved simple arithmetic problems, either addition (e.g., 4 + 9; n = 35), multiplication (e.g., 7 x 8; n = 31), subtraction (e.g., 14 – 6; n = 30) or division (e.g., 36 / 4; n = 45). For all four operations, participants solved problems with larger operands more slowly and less accurately than those with smaller operands (e.g., 4 + 3 vs. 9 + 6). Gaze durations, number of fixations, and patterns of first fixations were explored in relation to three interest areas: the first operand, the operation sign, and the second operand. Patterns of eye movements varied with both problem size and interest area, with addition and multiplication showing similar patterns that were very different from those shown in subtraction and division. The results provide novel information about the problem size effect by showing how the additional time spent on large problems is distributed across problem components.

69. *Symbolic and non-symbolic distance effects in number comparison and ordinality tasks*
Marcie Penner-Wilger, Kings University College at the University of Western Ontario

Both subitizing (the ability to quickly enumerate small sets without counting) and finger gnosis (the ability to form distinct mental representations of one's fingers) have been found to predict children's numeracy skills longitudinally (Penner-Wilger et al., 2007, 2008, 2009). In the current study, the relations among subitizing, finger gnosis and calculation skill were examined in university students. Consistent with the developmental data, both subitizing and finger gnosis significantly predicted calculation skill. In contrast to the developmental data, these relations were not mediated by the strength of number representations (indexed using both symbolic and non-symbolic distance effects).

Papers: Attention 3
Moderator: Cody Tousignant, University of Calgary

70. *Media multitasking and failures of attention*
Brandon C. W. Ralph, David R. Thomson, James A. Cheyne, Daniel Smilek, University of Waterloo

We examined the association between attention and media multitasking both online (through a series of self-report questionnaires) as well as in the laboratory. Positive associations were found between media multitasking and attention-related cognitive errors, as well as everyday lapses of attention and mind wandering. Furthermore, media multitasking was positively related to overall response variability on an in-lab sustained attention task (responding synchronously with a metronome). These findings suggest that the degree to which people engage in media multitasking is associated with deficits in sustained attention.

71. *Neuroimaging of visual attention in migraineurs between headache attacks*
Marla J. S. Mickleborough, Layla Gould, University of Saskatchewan; Todd C. Handy, University of British Columbia; Paul Babyn, Ron W. Borowsky, University of Saskatchewan

People with migraine have hyperexcitable visual cortical response to normal visual inputs between headache attacks (interictally). Given that attention paid to stimuli can affect excitability of response in visual cortex, our research focuses on interictal attention in migraineurs. Indeed, we found that migraineurs have abnormal attentional control in between headache events. Specifically, using probabilistic spatial attentional orienting tasks we found that migraineurs have heightened sensory responses of to-be-ignored visual stimuli (as measured via event-related potentials) and heightened visual-spatial orienting specific to sudden-onset peripheral events (as measured via reaction times). Our preliminary fMRI work links these findings to known attentional networks.

72. *Affective consequences of inhibition in working memory*
*David De Vito, Mark J. Fenske, University of Guelph

Attentional inhibition has negative affective consequences for task-irrelevant visual stimuli. Items represented in working memory (i.e., in the absence of external sensory stimulation) likewise become affectively devalued when they become irrelevant. Here participants judged whether visual patterns in a sequence matched the one presented two or three items before (n-back task). Stimuli whose working memory representations were correctly rejected (distractors) were subsequently rated as less pleasing than those matching the on-screen pattern (targets). Our results suggest that inhibition has negative affective consequences regardless of whether stimuli are present in the surrounding environment or represented in the absence of sensory stimulation.

73. *The effects of target knowledge on search for linearly and nonlinearly-separable targets*
John Brand, Concordia University; Chris Oriet, University of Regina; Jeremy Wolfe, Harvard Medical School & Brigham and Women's Hospital

Knowledge of target identity guides search for targets among linearly-separable distractors. Here, we manipulated foreknowledge of target size in colour/orientation conjunction searches. Target size was either linearly-, or nonlinearly-separable. In four experiments, target size was blocked or varied from trial-to-trial, and was either the only item of that size in the search array, or one of several. Foreknowledge of target size benefited search more for nonlinearly- than linearly-separable targets but target uniqueness benefited search for linearly-separable targets only when target size was blocked. Thus, when size was a reliable cue, observers used size irrespective of its task relevance.

Papers: Cognitive Processes 2
Moderator: Shannon O'Malley, Université de Montréal

74. *The role of context in the simultaneous learning of two complementary sequences*
Maria D'Angelo, Bruce Milliken, McMaster University; Luis Jiménez, University of Santiago de Compostela; Juan Lupiañez, University of Granada

In prior work, we examined the role of context in the learning of two complementary first-order conditional sequential structures. The core idea was that simultaneous learning of two complementary sequences may be possible if those two sequences are associated with distinct contexts. Here we extend our previous work by asking whether the same is possible for more difficult to learn higher order sequential structures. Our results show that participants are indeed able to learn implicitly two complementary second-order conditional sequences when those sequences are associated with distinct contexts. These results support an episodic interpretation of implicit sequence learning.

75. *Sequential effects in an attentional blink (AB) task*
Ellen K. MacLellan, Bruce Milliken, David I. Shore, McMaster University

The requirement to attend selectively to a target on one trial increases the efficiency of doing so again on the following trial (Gratton, Coles & Donchin, 1992). This effect is typically studied using response time methods that measure distractor interference. In the present study, we describe a new method for studying this issue that uses a two-target procedure, much like that used to study the attentional blink (AB). Large context effects on selective attention were measured with this procedure, and the data from two experiments suggest that these context effects owe primarily to automatic, rather than intentional, preparatory processes.

76. *Privileged loops between perception and action: It's hard to sit on your hands when processing direction*
Shannon O'Malley, University de Montréal; Derek Besner, University of Waterloo

Responding to directional stimuli in the environment is critical for navigation, however not all directional stimuli point in the same direction. We report an experiment which examined the impact of presenting two directional stimuli simultaneously (eyes and arrows) that were congruent or incongruent with each other either. On each trial a tone cued subjects to respond to the direction that the eyes looked OR that the arrow pointed. The task cue was either presented in advance of the target, or at the same time as the target. The results are discussed in terms of privileged loops.

77. *Consumed by the self: Evidence for degraded perceptual processing during self-referential judgement tasks*
Melaina T. Vinski, Adirana Wong, Jonathan Smallwood, Scott Watter, McMaster University

Mind wandering behaviour necessarily degrades sensory processing of task features. Self-referential Judgement Tasks recruit both the executive attention and default mode networks, a co-activation observed during mind wandering behaviour. The current work employs electroencephalography (EEG) to investigate whether self-referential processing suppresses cognitive processing of auditory (Experiment 1) and visual (Experiment 2) stimuli. Results suggest that self-referential processing suppresses both the P300 component (Experiment 1) and the N300 (Experiment 2) relative to other-referential processing. Findings provide novel evidence for degraded perceptual and semantic processing during self-referential processing, and provide an alternative paradigm for investigating network activation associated with mind wandering behaviour.

Symposium: Development of Concepts and Categorization
Chair: Susan A. Graham, University of Calgary
Abstract: Children's ability to label and categorize objects in the world is a central aspect of their cognitive development. In this symposium, we bring together research that examines development of concepts and categorization processes in children ranging from 11 months to 5 years of age, with tasks that include

categorization and induction paradigms. The results provide new insight about how children organize their experiences, and also how they extend and reason about that knowledge.

78. *Categorization across symbolic modalities: The effect of labeling on infants' inductive inferences*
Melanie Khu, Susan A. Graham, University of Calgary; Patricia A. Ganea, University of Toronto

Inductive inference involves reasoning that things that are true for one category exemplar will hold true for other instances of the same category. Infants 13- to 18-months have a nascent ability to make inductive inferences across symbolic modalities. Specifically, infants will make inductive inferences about the nonobvious properties of real-world objects based on seeing these properties depicted in a picture book. However, even at 18-months this ability appears to be relatively tenuous. Given that labeling signals category membership, the current experiments investigated whether providing labels for objects and their depictions would facilitate 18- and 21- month-olds' categorization across symbolic modalities.

79. *Inductive reasoning: Examining 11-month-olds' abilities*
Ena Vukatana, Susan A. Graham, Suzanne Curtin, University of Calgary

To investigate the origins of inductive reasoning, we familiarized 11-month-olds with novel animal-sound pairings (e.g., Animal1[red]-S1), followed by three test trials. When infants were presented with a familiar event, looking time remained low. When presented with a different animal-sound combination (e.g., Animal1[red]-S2), looking time to this unexpected event increased, suggesting that infants learned the original associations. However, difficulties with generalization were apparent as infants' looking time increased in response to a novel exemplar of a familiar category (e.g., Animal1[blue]-S1). An additional experiment, in which infants are familiarized to a greater number of category exemplars to facilitate generalization, is in progress.

80. *I brush my hair with this spoon: 24-month-olds' learn unconventional labels from unconventional actors*
Vanessa Schell, Susan A. Graham, University of Calgary; Annette Henderson, University of Auckland

We investigated whether unconventional behavior influences 24-month-olds' mapping of different types of labels. Infants observed an actor behave in conventional or unconventional ways (e.g., used a spoon to eat soup vs. a spoon to brush hair). Next, infants were taught a novel word or sound as a label for a novel object. (i.e., "Look at this! [fep/ring]"). Infants extended and generalized words, but not sounds in the conventional condition. In the unconventional condition, infants extended words and sounds but did not generalize them to the novel object, suggesting that infants will learn unconventional labels if they are communicatively useful.

81. *Development of the concept of antonymy: Evidence for sudden insight or gradual acquisition?*
*Catherine Phillips, Penny M. Pexman, University of Calgary

Understanding antonymy (the opposite meaning relationship between certain words) is an important conceptual development. Using a novel opposite task we investigated when young children understand the concept of antonymy and whether this understanding develops gradually or through sudden insight. Four- and 5-year-old children, but not 3-year-old children, performed above chance on the opposite task, demonstrating that older children have an appreciation for the antonymy relationship. Children's appreciation generalized to a number of different antonym pairs. Results of behavioural and eye gaze data analyses suggested that appreciation does not develop gradually but rather is better characterized as developing through insight.

ICT116

Papers: Neuropsychology/Development
Moderator: Jean Saint-Aubin, Université de Moncton

82. *Strategies and pseudoneglect on luminance judgments: An eye-tracking investigation*
Jean Saint-Aubin, Université de Moncton; Daniel Voyer, University of New Brunswick; Christine Cook, Université de Moncton
When asked to judge the relative importance of the left and right sides of a stimulus, participants overestimate the leftward features. It was claimed that this pseudoneglect effect is larger when a global appreciation is done than

when a comparison strategy is used. We tested this hypothesis in five eye monitoring experiments. Contrary to the strategy hypothesis, pseudoneglect was larger when participants were forced to use a global strategy by fixating only the center of the screen than when they were forced to compare by using a moving window paradigm only displaying one fourth of the line at a time.

83. *Dissociations in visual recognition in children with developmental prosopagnosia*
Kirsten A. Dalrymple, Dartmouth College & University College London; Brad Duchaine, Dartmouth College

Visual recognition depends on different mechanisms, but the developmental origin of those mechanisms remains unclear. Here we investigate children with facial identity recognition deficits (developmental prosopagnosia, DP) to determine whether recognition mechanisms depend on different developmental processes. We found a variety of behavioural profiles. Despite deficits with facial identity, some children with DP had normal object recognition, facial expression recognition, facial gender discrimination, and/or face detection. This suggests that these abilities rely on distinct mechanisms that are separated early in development and sheds light on the possible etiologies of DP.

84. *What do direct corticoneurons do?*
*Jenni M. Karl, Ian Q. Whishaw, University of Lethbridge

Traditional theories posit that direct corticomotoneurons evolved to mediate independent digit movements in primates. An alternate hypothesis is that they evolved for visual control of primate reach and grasp movements. We used frame-by-frame video analysis to compare the reach and grasp movements of macaques with bilateral corticospinal tract lesions (Lawrence & Kuypers, 1968) to those of blindfolded human subjects. The movements of both groups differed from normal visually guided reach and grasp movements in a similar and systematic way. The results are discussed in relation to the idea that direct corticomotoneurons could have evolved as the final output of the dorsal visual stream to allow for the visual control of integrated reach-to-grasp movements in primates.

85. *Do pre-school aged children expect unconventional speakers to maintain consistency in referential expressions?*
Michele Wellsby, Melanie Khu, Julie Sedivy, Susan A. Graham, University of Calgary

In a conversation, speakers and listeners usually converge on consistent referential descriptions of objects. We examined whether preschoolers expect this consistency if a speaker fails to adhere to typical conversational principles. Using an eye-tracking paradigm, we presented 4-year-olds with picture arrays. The experimenter either used conventional expressions to describe the objects or unconventional expressions. Following training, children were presented with trials where the target objects were referred to using either the original expression or a new expression. There was an advantage to using the same expression, regardless of speaker conventionality. Speaker conventionality did not appear to influence children's looking preferences.

SYMPOSIA AND PAPERS 6 - SUNDAY, JUNE 9 (12:00-1:00)

ICT121

Symposium: Neuroimaging Change: Reorganization Across Contexts
Chair: Andrea Protzner, University of Calgary
Abstract: The human brain is malleable throughout life, showing functional changes in relation to experience. This feature is most prominent early in life, but it is maintained throughout maturation into aged adulthood. The capacity for reorganization is the neural substrate for learning and memory. This symposium will focus on neuroimaging research to probe reorganization in several contexts: moment to moment changes in response to task demands, changes that result from long term learning, individual differences in task performance, and aging.

86. *Providing a frame for the construction of meaning: An electrophysiological investigation of task effects in visual word recognition*
*Ian S. Hargreaves, Penny M. Pexman, University of Calgary

Using fMRI, Hargreaves and colleagues (2012) found that activations for animal words varied as a function of decision category (is it an animal? vs. is it a concrete thing?). Concreteness emphasized object characteristics like

visual imagery, whereas animal decisions emphasized taxonomic information. A reliance on imagery information has been shown to influence frontal N400 and N700 components measured using electroencephalography (EEG; West & Holcomb, 2000). To assess this shifting reliance on imagery, we replicated Hargreaves et al. (2012) using EEG. We interpret our result within a framework in which conceptual representations are dynamically constructed (Kutas, 2012).

87. *A hobby can alter your brain: Neural correlates of visual word recognition in competitive Scrabble players*
Andrea Protzner, Penny M. Pexman, James Campbell, Ian S. Hargreaves, Lenka Zdrazilova, Sabine M. Seyffarth, University of Calgary; Peter Sargious, Alberta Health Services

Visual word recognition is highly efficient and considered fully developed in literate adults. Recent studies have shown that specific experience can further refine this system, revealing behavioral facilitation as a function of extended practice through competitive Scrabble playing. In an event-related fMRI study, we explored the relationship between Scrabble expertise and the neural networks recruited during a lexical decision task. Lower levels of Scrabble expertise were associated with reliance on canonical lexical-semantic regions, whereas higher levels recruited a more perceptual network. These findings are consistent with a flexible, experience-dependent word recognition system.

88. *Individual variability in spatial orientation and neural network topology*
Aiden E. G. F. Arnold, Andrea Protzner, Signe Bray, Richard Levy, Giuseppe Iaria, University of Calgary

Recent advancing in brain imaging methods have allowed scientists to being to understand how functional brain networks operate dynamically during cognition. However, much remains unknown about whether variability in the topology of functional networks relates to individual differences in cognition and behaviour. Here, we use Partial Least Squares (PLS) and graph theory to explore whether network topology underlies the ability to spatially orient. Our results suggest that the integrative capacity of brain networks and the centrality of brain regions within those networks strongly relates to the ability to orient in spatial environments.

89. *Changes in the neural correlates of episodic memory with healthy aging*
Maria N. Rajah, McGill University

Episodic memory is the ability to encode, store and retrieve personally experienced items/events (item memory), in spatial and temporal contextual detail (context memory). Declines in context memory are apparent by 60 years of age. I will present work from my laboratory indicating that these memory deficits are associated with structural and functional declines in the hippocampus (HC) and right lateral prefrontal cortex (PFC) and the altered recruitment of encoding- and retrieval-related neural networks. I will conclude by showing recent results extending this work to examine context memory in middle-aged adults.

ICT122

Papers: Memory 3
Moderator: Steve Lindsay, University of Victoria

90. *Why is recognition memory response bias conservative on paintings?*
D. Stephen Lindsay, Kaitlyn M. Fallow, University of Victoria; Justin Kantner, University of California at Santa Barbara; Priya Rosenberg, University of Victoria; Jordanna L. Freeman, University of Victoria

When tested on yes/no recognition for scans of paintings, most subjects make more misses than false alarms. That conservative response bias is especially large when stimuli mix words and paintings, but also occurs when paintings are the only stimuli. We tested three hypotheses as to the cause of conservatism on paintings: (a) Exaggerated expectations as to the memorability of paintings, (b) higher frequency of spontaneous reminding of prior stimuli for paintings than for words, and (c) greater perceived confusability for paintings than words. None of these hypotheses was strongly supported, leaving us with the question posed in our title.

91. *Forgive and forget? No, not really*
Angie Birt, Sarah Fanning, Mount Saint Vincent University

The assumption that “to forgive is to forget” was tested. Do memories of deeply hurtful events for which the transgressor has been forgiven differ in content and emotional experience from events for which the transgressor has not been forgiven? Memory reports and questions about two of the worst interpersonal transgressions participants experienced (one forgiven; one unforgiven) were analyzed for differences in objective and phenomenological qualities as a function of level of forgiveness and hurt. Results clearly indicate that forgiving does not result in forgetting, but, instead, reduces the strength of negative emotions experienced while recollecting hurtful events.

92. *Does assessing recollection influence confidence?*
Helen L. Williams, D. Stephen Lindsay, University of Victoria

In recognition memory, concerns have been raised that judgments of subjective experience and confidence may influence each other when made together (e.g., Bruno & Rutherford, 2010). To examine whether assessing subjective experience affects confidence, in the current experiment participants either made only confidence judgments for recognised items or made both confidence and subjective experience judgments (Remember, Know, Familiar, Guess). Results demonstrated that asking participants to assess their subjective experience did not influence their confidence.

93. *Measuring individual differences in prospective memory*
Bob Uttl, Carmela A. White, Daniela Wong Gonzalez, Joyce M. Hodgson, Mount Royal University

Prospective memory research is hindered by a lack of reliable continuous measures of prospective memory (ProM). With a few exceptions, previous studies have used binary success/failure measures of ProM that are inefficient, unreliable, and extremely poor for measuring individual differences. Accordingly, we have developed several new continuous paper-and-pencil measures of ProM. We embedded a series of ProM cues within personality and word knowledge inventories and increasing intrusiveness of each successive cue by increasing its font size, vertical lift, or horizontal spacing. The new measures are more reliable and useful for assessment of individual differences than binary success/failure measures.

ICT114

Papers: Cognitive Processes 3
Moderator: Peter Dixon, University of Alberta

94. *The role of conflict in memory formation*
Tamara Rosner, Maria C. D’Angelo, Ellen K. MacLellan, Bruce Milliken, McMaster University

The requirement to attend selectively to a target presented amongst distractors on one trial leads to smaller interference effects on subsequent trials (Gratton et al., 1992). This finding has been interpreted as evidence for increased cognitive control following the detection of conflict (Botvinick et al., 2001). Here, instead of short-term effects, we examined the long-term memory consequences of encountering conflict by manipulating the presence or absence of conflict in an incidental encoding task. We found better recognition memory for items encoded in the presence of conflict, suggesting that conflict may cue processes involved in episodic learning (Verguts & Notebaert, 2009).

95. *A philosophical reflection on mirror neurons*
Nalini E. Ramlakhan, Carleton University

Many developmental psychologists and functionalist philosophers of mind accept theory-theory as an accurate picture of how humans come to have mind-reading abilities. An equally popular and opposing theory to theory-theory is simulation theory. With the discovery of mirror neurons, Alvin Goldman put forth the hypothesis that mirror neurons support simulation theory. In this paper, I argue that there is ample evidence to support the view that the existence of mirror neurons accord well simulation theory. An in-depth look at the function of mirror neurons and simulation theory shows that mirror neurons work hand in hand with simulation theory.

96. *Memory biases drive decisions from experience*
*Christopher R. Madan, University of Alberta; Elliot A. Ludvig, Princeton University; Marcia L. Spetch, University of Alberta

When people make decisions from experience, they must rely on memories of prior outcomes. Memory studies have demonstrated that people remember salient experiences better than neutral ones. In two experiments, we show systematic biases in people's memories for past outcomes in a risky-choice task. Specifically, people over-report the extreme outcomes (big wins and losses) and over-estimate the frequency of obtaining the extreme outcomes relative to the equally-probable non-extreme outcomes. This memory bias drives risk preference, so that people are more risk seeking for gains than losses in experience-based decisions. These novel results reveal an important interaction between memory and decision-making.

97. *The cost of repeating a task*
Peter Dixon, University of Alberta

Switch cost is the common finding that changing tasks from one trial to the next is slower than repeating tasks. In the present experiment, I present evidence for 'repeat cost', the finding that repeating a task can be slower than switching. A task cue indicating the stimulus-response mapping was provided on every trial. However, occasionally, the cue was presented in red, and on these trials, subjects were to use the reverse stimulus-response mapping. Substantial repeat cost was observed on these reversed-cue trials. This effect suggests a compatibility effect operating at the level of task selection.

ICT116

Papers: Perception 2
Moderator: Diane Humphrey, King's University College

98. *Representation of emotion with colour is embodied*
Diane E. Humphrey, King's University College at the University of Western Ontario

The use of clothing, hair and skin to display expressive colour in drawings suggests an embodied representation of emotions in drawings. In colouring books depicting emotional scenarios expressive colours were seen in the clothing, hair and skin of the figures. The Actor of the emotion in drawings of surprise, sadness, guilt, and empathy was more often lighter colours. The Cause of the emotion was more often colours with higher levels of red, particularly in drawings of anger, pride, and guilt. Expressive use of colour was mostly obtained in the skin of the Actor and in the hair of the Cause.

99. *Asynchrony and information processing in networks of spiking neurons*
Eric S. Kuebler, Jean-Phillippe Thivierge, University of Ottawa

In the brain, periodic waves of activity, or oscillations, play a fundamental role in information processing. The effect of synchronous oscillations (i.e. correlated periodic input) has been characterized in terms of enhancements in spike timing reliability. Asynchronous oscillations (i.e. uncorrelated periodic input), despite generating experimental attention, are less well characterized. Numerical simulations of spiking neurons show that injecting asynchronous oscillations enhanced network discriminability, or the ability to emit distinct responses to different stimuli, over and above that of the synchronous network. In sum, findings highlight a novel form of trade-off between synchrony and asynchrony, juxtaposing reliability and stimulus discriminability.

100. *Taking a jab at the 'hard problem'*
Lukasz A. Kurowski, York University

Philosophers and cognitive neuroscientists have been grappling with trying to come up with neuro-phenomenological proposals that would crack what is known as the "hard problem" of consciousness (Chalmers, 1996). My proposal is threefold: firstly, I suggest that the solutions must be located in neural mechanisms; secondly, I content that the best candidate for showing how sensations and perceptions are coupled together in psychological time is found in the re-entrant neuronal looping between the thalamus and widely distributed

cortical areas; and thirdly, that the bedrock of this mechanism is found in what is called the "central pattern generator".

101. *Representing shared action goals: How novices learn to perform piano duets*
Janeen Loehr, University of Saskatchewan; Cordula Vesper, Central European University

Joint actions require multiple individuals to coordinate their actions to achieve a shared goal. We examined whether people learning a new joint action form representations of the shared goal or their individual contributions to the shared goal. Novices learned to perform piano duets with an experienced pianist at maximum speed, and then performed alone while hearing their own part (individual contribution) or both parts (shared goal). Performance errors indicated that novices learned the shared goal rather than their individual contribution. Thus, after only limited experience with a new joint action, joint goal representations can be stronger than individual goal representations.

POSTER SESSION 1 (FRIDAY 4:00-5:30PM)

Attention

102. *Reining-in the wandering mind by recording the driver's EEG: reversing the route-familiarity effect*
Matthew R. Yanko, Thomas M. Spalek, Simon Fraser University

We have shown that as drivers become more familiar with a route, they respond less promptly to emergencies (e.g., a vehicle braking). This Route-Familiarity effect was attributed to increased mind wandering along familiar routes. In the present study, the incidence of mind wandering was reduced by making drivers more aware that their performance was being monitored. This was done by recording EEG activity with an electrode cap, thus increasing the explicitness of monitoring. We found that monitoring reversed the route-familiarity effect. That is, drivers were faster to respond to emergencies when familiar with the route, consistent with the mind-wandering hypothesis.

103. *Stimulus onset, interference, and laterality effects in a word/emotion conflict task*
Cheryl Techentin, Megan Duffy, Christina Mitchell, David Cann, Mount Royal University

The present study examined the effect of stimulus onset asynchrony on interference and laterality effects in a dichotic word/emotion conflict task. Participants were asked to detect a target word or emotion among sounds presented dichotically. Trials varied in the time between receipt of the target cue and the presentation of the sounds (i.e., 500ms, 750ms, 1000ms). Findings suggest that shorter and longer SOAs increase interference effects. Additionally, the direction of the laterality effects tend to change with increased SOAs. Results are discussed in the context of Cognitive Load theory and Kinsbourne's (1970) Attentional theory of laterality effects.

104. *Attentional set and laterality effects in two dichotic sarcasm tasks*
Cheryl Techentin, Famira Racey, McMillan Wilkowich, Mount Royal University

The present study examined the role of attention in two versions of a dichotic sarcasm task. In each of two conditions, participants were presented with phrases pronounced in both sarcastic and sincere intonations, and asked localize the ear in which they perceived a target tone. Conditions differed in the presentation of the target (i.e. either changing across two blocks of trials or randomized between each trial). Although both tasks produced similar patterns of laterality effects, the magnitude was greater in the blocked task, suggesting that blocking the target allows the development of attentional strategies.

105. *Visual search is postponed during the period of the AB: an event-related potential study*
Hailey E.P. Lagroix, Simon Fraser University; Anna Grubert, Birkbeck College University of London; Thomas M. Spalek, Vincent Di Lollo, Simon Fraser University; Martin Eimer, Birkbeck College University of London

Ghorashi, Smilek, & Di Lollo (2007) have claimed that visual search is postponed during the period of the attentional blink (AB). We tested this postponement hypothesis using an AB paradigm with a digit as the first target (T1) and a pop-out search display as the second target (T2). Both T2-locked reaction times and N2pc (an

event-related potential index of attentional selection) were delayed during the AB. This is consistent with the idea that visual search is postponed during the AB until T1 processing is complete. The search is then performed as in a single task.

106. *Lego people are people too: Animacy effects for non-animate objects in a change detection task*
Rachael Cullen, Mitchell R. LaPointe, Bianca Baltaretu, Melissa Campos, Natalie Michalski, Suja S. Satgunarajah; Michelle L. Cadieux, Matt V. Pachai, David I. Shore, McMaster University

Animate objects appear to have attentional priority in a change detection task. This result has been seen for detecting humans versus objects, and animals versus objects. Here we use a flicker paradigm to compare change detection times for Lego 'people' in comparison to Lego 'non-people' objects. Across two sets of stimuli we observe a detection advantage for the people over the non-people. Further, we were unable to disrupt this performance benefit by inverting the scenes. We interpret these findings in relation to the claim that change detection can imply processing of animacy per se.

107. *Investigating the time-course of the distractor devaluation effect*
*Pamela Stevenson, Joel Eatmon, Biljana Stevanocski, University of New Brunswick

We investigated the time-course of the distractor devaluation effect. Distractor devaluation refers to the lower ratings of ignored distractors relative to attended targets, which has been argued to reflect inhibitory processes that are applied to distracting items (Fenske & Raymond, 2006). To examine the time-course, we manipulated the timing between a selective attention display (to which participants localized a target item) and an evaluation task (in which participants rated the "cheeriness" of either targets or distractors). The size of the effect increased as the inter-stimulus interval increased; results are discussed in relation to the hypothesized inhibitory processes that underlie the effect.

108. *When the mind is restless, so too is the body*
Paul Seli, Jonathan Carriere, David Thomson, Daniel Smilek, University of Waterloo

We explored the possibility that mind-wandering is temporally associated with fidgeting. To do this, we measured fidgeting while participants completed a sustained-attention task, during which we intermittently sampled their thoughts to identify periods of mind-wandering. In Study 1, using a dichotomous measure of mind-wandering, we observed that mind-wandering was accompanied by increases in fidgeting and response variability in the sustained-attention task. In Study 2, using a continuous measure of mind-wandering, we observed that only deep mind-wandering produced increased fidgeting, whereas response variability increased even during mild mind-wandering. These findings are discussed in the context of the attentional-resource account of mind-wandering.

109. *Is distractor devaluation the result of location-based processes?*
Pamela Stevenson, Biljana Stevanovski, University of New Brunswick

The present study examined the importance of location in the distractor devaluation effect (i.e., the devaluation of neutral distractors relative to targets). Raymond, Fenske, and Westoby (2005) previously showed that distractor location impacts the magnitude of devaluation. Our participants first viewed a target-distractor pair and indicated the location of the target (i.e., attended location). To assess whether distractor inhibition is tied to the location of the distractor or to the distractor item, the target or distractor was evaluated at either the previously attended or ignored (i.e., distractor) location. Findings suggest that distractors are equally devalued at previously attended and ignored locations.

110. *Upper visual-field distractors increase attention to the left*
Nicole A. Thomas, Flinders University

Individuals exhibit an attentional bias toward the left side, known as pseudoneglect, and the strength of this bias is influenced by various factors, including vertical elevation. A series of experiments examined the effect of distractor stimulation on attentional asymmetries. Leftward biases were stronger following distractor stimulation in the upper field relative to baseline, suggesting upper field distractors bias attention toward the left. However, when attention was explicitly directed upward through cueing, biases did not differ between visual fields. The increased

leftward bias potentially results from additional right hemisphere activation, as a result of an exogenous shift of attention.

111. *Interactions between remembered visual features and search performance*
Jason Rajsic, Dorothy Yu, Daryl E. Wilson, Queen's University

Items in working memory can influence visual search, biasing attention towards matching stimuli. How such shifts subsequently change memory, if at all, is less well understood. Participants performed a visual search for a colour-defined target during the retention interval of a continuous-report memory test. Either the colour or orientation of memory items was tested, with the untested feature acting as a recall cue. Search was faster when the target colour matched a remembered item colour regardless of which memory feature was to be reported. Memory performance for the matching item, however, was only affected when colour was the reported feature.

Cognitive Processes

112. *Eye contact increases arousal but staring contests don't*
Michelle Jarick, MacEwan University; Kaitlin Laidlaw, Alan Kingstone, University of British Columbia

Evidence suggests that eye contact increases physiological arousal, but these studies are typically limited to a few seconds of eye contact. We show that when participants seat next to each other, and stare at each other for 1-minute, arousal can be markedly increased, especially if preceded by a game that encourages participants to view each other as cooperative partners rather than competitors. Implications for why eye gaze is arousing is discussed.

113. *Word length and response modality in immediate memory: New insights on retrieval process*
Olivia Beaudry, Jean Saint-Aubin, Katherine Guerard, Université de Moncton

In immediate memory, a great deal is known about presentation modality, but response modality has been neglected. Here, participants did an immediate order reconstruction task in which they had to replace the presented words in their original order immediately after their presentation. Participants did a forward and a backward recall of lists of short and long words. Participants either recalled the items orally, by typing them or by clicking on them and they either received or not feedback. Results revealed a word length effect in all conditions, but its size was modulated by response modality and the presence of feedback.

114. *A speed accuracy trade-off analysis of the Stroop effect*
Nicole E. Webb, Jason Ivanoff, Saint Mary's University

Chronometric analyses of the Stroop effect, relying on delta plot or Vincentizing approaches, demonstrate that colour-word interference increases with reaction time (i.e., slower RTs, bigger Stroop effect). The implications of this timecourse are (1) Stroop effects are relatively slow to develop and (2) they do not seem to decay within the course of a trial. The goal of the present study is to examine the timecourse of the Stroop effect using speed-accuracy trade-off (SAT) methodology. The SAT analysis demonstrates an increase followed by a decrease of Stroop interference. We discuss these findings in the context of information accumulation models.

115. *Chips or chocolate? Personal preference revealed in reaching*
*Grace Truong, University of British Columbia; Craig S. Chapman, University of Alberta; Tina S. T. Huang, James T. Enns, University of British Columbia

Given kinematics can reflect decision-making (Freeman et al., 2011), we examined whether motor behavior can index subjective preference. Participants selected from pairs of treats by reaching for their preferred snack and later rated preference for each treat. We predicted easy decisions (large preference differences) would produce faster and more direct movements than tough decisions (small preference differences). Initiation time, reach area (directness), and an interaction between these measures were significant predictors such that reach area was predictive of preference difference when initiation times were fast but not slow. This suggests decision-making can be pushed into the action phase of choosing.

116. *Finger-counting habits and number processing in Canadian and Chinese university students*

Kyle Richard Morrissey, Mowei Liu, Trent University; Jingmei Kang, Qiangqiang Wang, Yanbang Zhou, Northeast Normal University

Prior research has suggested that some aspects of number-concept development are influenced by finger-counting habits (Noel, 2005). The purpose of the study was to examine the cognitive influences of culturally acquired finger-counting habits in Canadian and domestic Chinese university students. 70 Chinese and 77 Canadian students completed a finger-counting habit test and a series of number comparison tasks. The response time patterns across the two cultural groups were compared. It was found that finger-counting habits had strong influences on number processing. Predictive utility of finger counting habits were strongly influenced by when, during the task, participants were questioned about them.

117. *Numerical sequence knowledge and its relation to arithmetic fluency*
Angelle Bourassa, Jo-Anne LeFevre, Carleton University

Adults (N = 42) determined if three-digit sequences were in ascending order (e.g., 138 vs. 183). Four types of stimuli were used: counting (e.g., 123) balanced (e.g., 258), arithmetic (e.g., 134), and neutral (e.g., 127). Participants responded more slowly to unordered than to ordered digits for counting and arithmetic sequences whereas there was no order effect for neutral sequences. These patterns suggest that the unordered digits from familiar sequences interfere with participants' decisions. Only highly-skilled participants showed differential response times for balanced sequences. These findings indicate that it is familiarity, and not ordinality, that predicts variation in sequence processing.

118. *Influences on cognitive advantages in bilinguals*
Cody J. Eriksen, Cassandra Foursha-Stevenson, Mount Royal University

Research focusing on individuals who speak more than one language has revealed several psychological benefits, which include enhanced cognitive flexibility and executive functioning. However, many of these findings are inconsistent in young adults. The current study investigated influences on these advantages, such as language family and language use. English monolinguals and bilinguals separated by language family performed various cognitive tasks. Analysis revealed that English-Tagalog speakers were significantly faster at performing the Simon Task than English monolinguals. This difference was not found for other language families. Influences on cognitive advantages, such as daily language inhibition and language similarity are discussed.

119. *Exploring different levels of encoding within the mixed list paradox*
Karly J. Dudar, Patrique Brochu, Justin Chamberland, Laurentian University

The mixed list paradox has typically been explored in serial recall, however more recently it has been seen in recognition tasks. The item order hypothesis (IOH) attempts to explain the mixed list paradox. The current study tests this hypothesis by manipulating encoding. Pure and mixed frequency lists comprised of 6 words were tested under either recall or recognition instructions. A frequency by context interaction was found for accuracy. Data is further explored in relation to the serial position curve and mixed in relation to the IOH.

120. *Cognitive correlates of mathematical ability*
Jordan Rozario, University of Waterloo; Christian Battista, Daniel Ansari, University of Western Ontario; Jonathan A. Fugelsang, University of Waterloo

Past research has found that mathematical ability is positively associated with several cognitive factors, including numerical magnitude processing and working memory, but negatively associated with negative emotional perceptions of math (i.e., math anxiety). In the present study, we investigate the degree to which these individually established relations are moderated by each other. Analyses revealed that controlling for individual differences in working memory reduced the relations between mathematical ability and numerical magnitude processing, and mathematical ability and math anxiety. These data will be discussed in terms of contemporary theories of mathematical ability.

121. *The trail in the forests? How grammatical structure impacts perceived plausibility of English and French sentence beginnings*

*Robyn Carson, Alain Desrochers, University of Ottawa

This study investigates the plausibility of English and French sentence beginnings with a [noun] of [noun] grammatical structure. University students (n = 110) rated 432 sentence beginnings on a 7-point scale. We hypothesized that a singular-plural noun structure would be considered less plausible. One-way ANOVAs indicate significant differences based on grammatical structure. Planned comparisons reveal an identical pattern in English and French: faster more plausible ratings for singular-singular structure and slower less plausible ratings for singular-plural structure. Significant correlations demonstrate strong to moderate relationships between English and French plausibility ratings (r = .85) and response times (r = .50).

122. *Dissociate the position error and heading error of spatial updating during physical and visual locomotion*
*Lei Zhang, Weimin Mou, University of Alberta

In this study, we measured people's position and heading estimation after walking or transporting a path. Results showed that the self-position and self-orientation estimations were both more inaccurate in transportation than in walking. However, when a clock wall was added to indicate orientation during transportation, the heading estimation was improved but not for the position estimation. On the other hand, when people were disoriented after walking, the position estimation was not impaired but the heading error was at the chance level. Results indicate position and heading representation can be dissociated, and inertial cues in walking are important to update both.

123. *The benefits of distraction in value learning*
James Farley, University of Alberta; Kim Shapiro, University of Birmingham

Value learning refers to the process of forming valence associations (positive/negative) with stimuli encountered in our environment. These probabilistic associations are grounded in experience and inform on likely benefits and consequences of future actions based on prior learning, helping to promote beneficial interactions while encouraging avoidance of those that are detrimental. In the present study it is shown that both by depleting working memory resources, as well as by presenting a concurrent visual distraction, the acquisition of positive associations is expedited relative to controls. Interpretations surrounding a shift from explicit to implicit cognitive processes supporting task completion are discussed.

124. *The elusive effect of cognitive priming on object-location memory*
Heloise Drouin, Patrick Davidson, University of Ottawa

Priming a holistic mindset facilitates context-dependent cognitive procedures, such as object-location memory (Kuhnen & Oyserman, 2002). In two previous studies, (Kuhnen & Oyserman, 2002; Oyserman, Sorensen, Reber & Chen, 2009) young adults in the holistic priming condition showed significantly better memory for object locations in an array than did those in the analytical priming condition. In a previous replication study (n=117) we found an unanticipated interaction between priming condition and gender. In this study, we attempted to replicate this finding (n=86) by including gender as a formal factor and increasing the priming effect. No main effects or interactions were significant.

125. *Disease specific and genetic liability effects on cortical thickness in schizophrenia*
Andrea M. Moir, Michael J. Spilka, Vina M. Goghari, University of Calgary

Schizophrenia is a severe psychiatric disorder that has been associated with widespread structural brain abnormalities, including regional changes in cortical thickness. Interestingly, healthy relatives of schizophrenia patients have also been found to have gray matter abnormalities, which may represent a genetic liability for the disorder. Using magnetic resonance imaging, the present study investigated cortical thickness in 28 individuals with schizophrenia, 28 unaffected first-degree relatives, and 27 healthy controls (N = 83, 53% female, mean age = 41.3). Compared to the control group, ongoing analysis has revealed grey matter abnormalities in schizophrenia patients, and attenuated abnormalities in their first-degree healthy relatives.

Development

126. *Overt production of phonation and speech: An fMRI study of the neural networks in children*
Julia Esch, Jacqueline Cummine, University of Alberta; Crystal E. Franklin, William E. Rogers, Jinqi Li, Amy L. Parkinson, University of Texas Health Science Center at San Antonio; Carol A. Boliek, University of Alberta

Little is known about neural networks related to overt speech production in children. Fourteen children (5-10yrs) were continuously scanned during overt productions of phonation (ah) conversational loudness, loud phonation (ah) twice-conversational loudness, and production of words. Phonation produced activation in the right-superior temporal gyrus and cerebellum. Speech showed activation in right-superior temporal gyrus and left-cingulate gyrus. Activation for speech > phonation included right-temporal gyri and medial frontal cortex. Activation for loud phonation > phonation included left-temporal gyri and bilateral medial frontal gyri. Our results are consistent with the DIVA model of speech acquisition and production (Guenther & Vladusich, 2012).

127. *Infant vocal responses to questions and declaratives in maternal speech*
Melissa C. Reimchen, Melanie Soderstrom, University of Manitoba

Young infants attend to the prosodic characteristics that distinguish questions from declaratives and they show a reliable preference for questions (Soderstrom, Ko, & Nevzorova, 2011). These sentence types are characterised by specific end of utterance pitch contours (i.e., rising pitch and falling pitch associated with questions and declaratives, respectively). The high and variable pitch of infant directed speech is thought to engage and maintain infants' attention (e.g., Snow, 1977). Accordingly, an attentional bias toward rising pitch may partially account for infants' perceptual preference for questions. In a current study, we hypothesise that infant vocal behaviour may be influenced by the proportion of questions and declaratives contained in maternal speech. Audio recordings of mother-infant dyads were collected during semi-naturalistic play sessions to evaluate the duration, frequency and pitch characteristics of infant vocal responses to questions and declaratives in maternal speech. We suggest that questions are both linguistically and socially relevant for the developing infant.

128. *Infants' discrimination of positive emotional sounds across cultures*
Melanie Soderstrom, University of Manitoba; Disa Sauter, University of Amsterdam; Melissa C. Reimchen, University of Manitoba

Infants develop the ability to discriminate auditory expressions of affect within the first half year of life (Walker-Andrews, 1997). To what extent are these abilities limited by culture and experience? It is evident from recent findings with adults that auditory expressions of emotion are to some extent universal (Sauter et al., 2010). In a series of three experiments, we examined infants' discrimination of two auditory expressions of positive affect, relief and achievement. In Experiment 1, a single speaker's voice was used. In Experiment 2, multiple speaker voices were used, all from a Western (British English) background. In Experiment 3, infant's discrimination across culture/language contexts was tested using British English samples and a sample from an African (Himba) speaker. We found that infants as young as 6 months reliably discriminate acoustically the categories of vocal expression of relief and achievement uttered by a single speaker. Older infants discriminate these emotional sounds across speakers and, to some extent, across cultures. It appears that infants detect similarities in auditory expressions of positive emotion and their ability to do so may approach universality by late infancy.

129. *Testing the ecological validity of infants' speech stream segregation*
*Dana E. Bernier, Melanie Soderstrom, University of Manitoba

Previous research has shown that 9-months-olds can segregate one speaker from nine others reading out loud at a 10 dB signal-to-noise ratio. However, typical conversational speech is perceptually different from reading out loud. To assess the ecological validity of this finding we used the head-turn preference procedure contrasting passages of naturally derived multi-talker speech with those containing added target stimuli. Our preliminary findings suggest that 9-month-olds have trouble with this background, showing no preference for the passages with target speech over those with background alone. Currently we are testing 12-month-olds to see if they can discriminate under natural multi-talker conditions.

130. *The relationship between rule-based category learning and executive functioning in children and adults*
*Rachel Rabi, John Paul Minda, University of Western Ontario

The present study examined developmental differences in the acquisition of rule-based category knowledge. Children (ages 4-11) and adults learned a unidimensional rule-based category and their inhibitory control and working memory abilities were measured. Categorization performance improved with age. Younger children struggled with rule learning, whereas the performance of older children approached that of adults. Model-based analyses suggested that performance differences were due to young children's inability to inhibit the salient, but irrelevant rule. Additionally, working memory and inhibitory control were predictive of categorization performance. Findings suggest that the development of category-learning abilities may be dependent on executive functions.

131. *Teachers' and parents' math anxiety affects girls' math achievement*
Erin A. Maloney, University of Chicago; Elizabeth Gunderson, Temple University; Gerardo Ramirez, Susan Levine, Sian L. Beilock, University of Chicago

Math skills are important for success in school and everyday life. Yet, many people experience a great deal of anxiety when dealing with numbers termed math anxiety. We demonstrate that girls' math achievement is influenced by their teachers' and parents' math anxiety. First and second-grade students completed measures of math achievement at the beginning and end of the school year. Their teachers and their parents completed measures of math anxiety. By the end of the school year, girls with a math anxious teacher or parent experienced less growth in mathematics than girls who had neither an anxious parent nor teacher.

132. *Interactive irony processing in middle childhood*
Juanita M. Whalen, Penny M. Pexman, University of Calgary

In the present study 5- to 8-year-old children were presented with short puppet shows involving an ironic utterance spoken between characters who were siblings or characters who were strangers. Children's appreciation and processing of ironic utterances were measured using a visual-world paradigm. The presence of a sibling relationship facilitated children's early processing of ironic language, suggesting that sibling relationship information may be a useful cue to irony, and providing support for interactive processing accounts of irony comprehension.

133. *Children's processing of verbal irony: The earliest moments*
Andrew T. Nicholson, Juanita M. Whalen, Penny M. Pexman, University of Calgary

Irony is a complex language device used by speakers who intend the opposite meaning of words spoken. Processing of ironic meaning has been explained by both modular (serial processing) and interactive (parallel processing) theories. We investigated which framework best describes children's processing of ironic language. To do so we examined children's eye-gaze and response latencies from the earliest moments of processing in a visual-world paradigm. Results supported an interactive, parallel processing framework. In addition, results showed that children's irony appreciation was correlated with empathy development.

134. *What do children understand about disfluencies in language?*
Sarah Owens, Susan A. Graham, University of Calgary

Filled pauses (e.g., uhh or umm) are a common occurrence in language, and are systematically produced before words that are new to a discourse (Arnold & Tanenhaus, 2011). Using an eye-tracking paradigm, we investigated whether 42-month-old children are attuned to this phenomenon. Results revealed a significant interaction between discourse status and fluency ($p < .05$). During initial processing, children looked significantly more to the discourse-new object during disfluent trials, but did not show this bias during fluent trials. These results indicate that hearing "thee uhh" led children to anticipate reference to the discourse-new object.

Memory

135. *Prospective memory, personality, and individual differences in cognition*
Bob Uttl, Carmela A. White, Daniela Wong Gonzalez, Joanna McDougall, Carrie A. Leonard, Mount Royal University

Studies investigating the relationship between personality and prospective memory (ProM) arrived to inconsistent conclusions. Accordingly, we conducted two studies: a meta-analysis investigating the relationship between ProM and personality and a new study with 378 participants examining this relationship along with intelligence and other cognitive factors. The meta-analysis revealed very weak correlations between ProM and three of the Big Five Factors. The second study showed that the relationship between ProM and personality factors depends on the ProM subdomain (vigilance/monitoring vs. episodic ProM) and that ProM correlated with individual differences in cognition such as verbal intelligence.

136. *Intentionally forgetting other-race faces: Costs and benefits?*
Ryan J. Fitzgerald, Heather L. Price, Chris Oriet, University of Regina

The directed forgetting procedure involves cueing some information to be remembered and other information to be forgotten. We compared directed-forgetting conditions to control conditions to assess whether forgetting faces of one race could enhance memory for faces of another race. Memory instructions were embedded within the context of criminal (Experiment 1; N = 116) and non-criminal (Experiment 2; N = 94) storylines. Although faces generally were forgotten on cue, forgetting some faces conferred no benefit for remembering other faces. Moreover, exposure to forget-cued faces impaired recognition of remember-cued faces. Thus, forgetting faces yielded costs but not benefits.

137. *Thanks for the memory…failures! The effect of priming memory fallibility on memory failure interpretations*
Michelle Crease, Peter Graf, Christopher Lee, University of British Columbia

Prospective memory (ProM) failures tend to be interpreted as personality flaws; retrospective memory (RetM) failures tend to be interpreted as memory breakdowns. In previous research, this tendency was reduced slightly when participants took the perspective of the failure protagonist. The present study examined how this tendency is affected by priming memory's fallibility. For this purpose, participants generated examples of personal ProM and RetM failures immediately prior to giving their interpretations of memory failures described in a series of brief vignettes. The results showed that our failure priming manipulation reduced differences in the interpretations participants offered for ProM versus RetM failures.

138. *Order information is differentially retained in the production effect*
Tanya R. Jonker, Merrick Levene, Colin M. MacLeod, University of Waterloo

Several encoding techniques, such as generation, produce a free-recall advantage in mixed lists but this pattern is eliminated (or reversed) in pure lists. McDaniel and Bugg (2008) proposed an item-order account that emphasizes item-specific elaboration for uncommonly-processed stimuli (e.g., generated), and retention of order information for commonly-processed stimuli (read) in pure lists. Like generation, saying words aloud (i.e., production) benefits these items relative to reading silently in mixed lists but rarely in pure lists. We found that production fits with this class of encoding techniques: Participants better remembered order for silent items in pure lists, consistent with the item-order account.

139. *Generating better readers and/or generators across two study-test blocks*
Andrea N. Burnett, Glen E. Bodner, University of Calgary

Using a study-test study-test design with unique items in each block, de Winstanley and Bjork (2004) found that experiencing the generation effect on Test 1 eliminates the effect on Test 2 due to improved recall of read items. We replicated this effect, but we also found that those who experienced a negative generation effect on Test 1 showed improved recall of generate items on Test 2. Furthermore, participants who did not experience differential recall on Test 1 improved recall for both item types on Test 2. Thus, the first study-test block experience shaped whether participants became better readers and/or generators.

140. *The differential role of familiarity in yes-no and forced-choice recognition*
*Fahad N. Ahmad, William Hockley, Wilfrid Laurier University; Myra Fernandes, University of Waterloo

Ahmad and Hockley (2013) compared associative recognition for compound (needle point) and unrelated (grape stool) word pairs. In yes-no recognition, both hit and false alarm rates were greater for compound pairs with no

difference in discrimination. In contrast, a discrimination advantage was found in forced-choice recognition. Ahmad, Fernandes and Hockley (2013) replicated both effects for young adults, and found that older adults showed a discrimination advantage for compound pairs in both yes-no and forced-choice recognition. We argue that familiarity is greater for unitized compound word pairs, and that forced-choice provides more support for familiarity-based decisions than does yes-no recognition.

141. *Action compatibility effect in object memory*
Sébastien Lagace, Katherine Guerard, Université de Moncton

Several studies suggest that objects' motor affordances influence their recognition. However, the role of motor affordances in object memory is more limited and results are contradictory. The objective of the present study is to investigate the role of affordances in short term retention of objects. Participants had to memorize sequences of objects. During memorization, they had to perform a congruent or an incongruent action in relation to the object to memorize. Results showed that performing an incongruent action impaired memory performance, suggesting that motor affordances play a role in object memory.

142. *The eye of the beholder? Discrepancy reactions and beauty judgments*
Natasha Pestonji, Francine de los Reyes, Peter Graf, University of British Columbia

How do we react to cues that we process differently than expected? Discrepancy-attribution theory posits that processing targets with unexpected fluency generates a discrepancy response that influences cognitive decisions. The present study sought to investigate the role of a discrepancy attribution mechanism in rating judgments. We induced discrepancy reactions by creating and then violating cognitive expectancies of the perceptual processing of grid patterns, and required students to make beauty judgments. Results revealed that priming a stronger expectation led to faster response times.

143. *Gender effects on memory failure judgements*
Sophia Solomon, Michelle Crease, Peter Graf, University of British Columbia

Prospective memory (ProM) failures relate to future planning (e.g. forgetting a meeting) while retrospective memory (RetM) failures are about the past (e.g. forgetting someone's name). Research shows that the former are viewed as signs of an unreliable person and the latter as resulting from an unreliable memory. We investigated whether interpretations are affected by a protagonist's gender and found larger differences between ProM versus RetM failures, and failures that were social (rather than asocial) committed by female protagonists. RetM failures committed by male protagonists were interpreted as resulting from personality flaws, an unexpected pattern which differs from female protagonists.

144. *Context valence influences prospective memory*
Martin Yu, Peter Graf, University of British Columbia

We previously found higher prospective memory performance when neutral cues were displayed in valenced contexts rather than in a neutral context. To determine how valenced cues would be affected by valenced contexts, we required students to respond to either positive, neutral, or negative picture cues which were displayed in different contexts created using picture series that were positive (e.g., a cuddly kitten), negative (e.g., a broken arm) or neutral (e.g., a plate of apples). Findings indicate that for neutral cues, prospective memory is better in valenced contexts, while no effect of context valence was found for valenced cues.

145. *The effect of positive and negative feedback on the revelation effect*
Bertrand Sager, Alexandria Goodwin, Devon Currie, Andre Asfaig, Daniel M. Bernstein, Kwantlen Polytechnic University

The revelation effect is a memory phenomenon where people consider words to be more familiar immediately after an intervening problem-solving task than after no intervening task. We hypothesize that the dopaminergic reward system drives the revelation effect. In the present study, we used two-solution anagrams as a problem-solving task and manipulated the feedback participants received for their anagram solution. When we told participants that their anagram solution was correct, the revelation effect increased. Conversely, when we told

participants that their solution was incorrect, the revelation effect reversed. This is preliminary evidence of a dopaminergic feedback account of the revelation effect.

146. *The elimination lineup: Does it improve identification accuracy for adults?*
Lisa Pascal, Alan Scoboria, University of Windsor

The effectiveness of the sequential lineup has recently been called into question with adults, and research finds it is ineffective for children. The elimination lineup was created to improve children's identification accuracy, but there has been limited research on its effectiveness with adults. The effectiveness of the elimination lineup with adult eyewitnesses was explored in this study. Participants watched a video and were asked to identify the culprit in a target present or absent lineup using one of three lineup procedures (simultaneous, sequential, and elimination). Results show different identification rates depending on the type of lineup.

147. *Can games be entertaining and beneficial? A look at Whack-a-Mole as a cognitive training tool*
Zorry Belchev, Peter Graf, University of British Columbia

Due to an increasing percentage of the population reaching age 65 and over, major efforts have been made to effectively increase or maintain current cognitive abilities, which naturally decline with age. Recent endeavors, though promising, have lacked an entertainment factor needed for continual training. In the current study, an iPad game (Whack-a-Mole) was designed for this purpose. Validating that it taps into pertinent areas of cognition, the results from young adults showed significant correlations between game performance and executive function measures (attention, speed of processing, inhibition, working memory) that are known to be particularly vulnerable to aging.

148. *Reconsolidation in context-activated object memory*
Jordan O'Byrne, Emily Cole, Dave G. Mumby, Concordia University

Retrieval is thought to destabilize consolidated memories, such that reconsolidation is required for the memory to persist. This hypothesis was verified in object-recognition memory, using context-activation to elicit retrieval. Rats were familiarized to a context paired with an object. Twenty-four hours later, rats received systemic injections of saline or anisomycin (50 mg/kg), a protein synthesis inhibitor known to disrupt reconsolidation. Rats were then exposed to the familiarization context without objects, to context-activate the object memory. Twenty-four hours later, retention was assessed using the novel-object preference test. Rats in both conditions showed retention, providing no evidence to support the reconsolidation hypothesis.

149. *Language experience shapes cognition: Comparing memory for Chinese and English words*
*Jeffrey Wammes, Myra Fernandes, University of Waterloo; Janet Hsiao, University of Hong Kong

The dual-task paradigm was used to infer the locus of language representations in the brain. We compared susceptibility to retrieval interference on a recognition memory test for visually presented Chinese or English words, in bilingual Chinese-English or monolingual English participants. Following full attention encoding, recognition occurred under either full or divided attention (DA) conditions with distracting tasks requiring either phonological or visuospatial processing of auditorally presented letters. Results indicated that bilinguals were more susceptible to visuo-spatial than phonological interference, while the English group displayed the opposite. It is clear that English relies on phonological processing, while Chinese requires visuo-spatial discrimination.

150. *Are you shifting now?: Criterion shifting in recognition memory can occur without awareness of strengthening*
Sol Sun, Andrea Hughes, University of the Fraser Valley

Signal detection theory assumes that a key component of recognition memory is the decision criterion, the strength threshold beyond which a response will be elicited indicating that some stimulus has occurred previously. In some contexts, performance would be optimized if this criterion could be dynamically shifted. However past research suggests that under many conditions, participants are unable to shift their criterion. It is currently unclear whether shifting deficits stem from an underlying lack of motivation, or a difficulty in monitoring strength differences. By manipulating awareness to strengthening, we provide evidence for the monitoring difficulty account.

151. *Behavioural and synaptic effects of 17-β estradiol and estrogen receptor activation in the perirhinal cortex*
Laurie Hamel, Nicole J. Gervais, Shaena Khoury, Donato Ercolani-Arts, Wayne G. Brake, Dave G. Mumby, Concordia University

The aim of the present study was to investigate the role of 17-β estradiol (E2) and estrogen receptor (ER) β activation in the perirhinal cortex (PRh) in object-recognition memory and whether E2 affects synaptic density in this region. Infusions of E2, an ER β agonist, and vehicle were given to OVX rats prior to 2 object-recognition memory tests. Findings confirm a divergent effect of E2 on two object-recognition memory tests and suggests it is mediated by ER β. Fluctuations in dendritic spines are discussed as a potential mechanism for the observed behavioural effects.

152. *Look at her, but not at him: Gender specific memory effects arise from eye contact*
Sophie Lanthier, University of British Columbia; Michelle Jarick, MacEwan University; Mona Zhu, Soo Jeong Byun, Alan Kingstone, University of British Columbia

The present studies investigate whether eye contact facilitates memory for words presented verbally. A female or male investigator read words aloud and varied whether eye contact was, or was not, made with a participant. With both female and male investigators, eye contact improved word recognition only for female participants. These findings suggest that eye contact facilitates encoding and later memory for females, but not for males. We conclude that females are more attentive to nonverbal behavior than males. The implications of these data, with regard to the role of eye contact and memory between genders will be discussed.

153. *Crossmodal memory processes over time*
Lisa Zhang, Ephraim Fung, Joanne Shih, Colleen Brenner, University of British Columbia

Little is known about the precise processes that occur during the delay of a memory task in terms of time and modality. In order to address these questions, 45 participants were given a crossmodal delayed match-to-sample memory task. Visual and auditory distractors were inserted either early or late during the memory delay to see which would be most disruptive to performance. A significant main effect of time of distractor was found, suggesting that the late phase of the memory delay may be important for crossmodal short-term memory performance.

154. *Gaming with benefits: Validation of a new intervention for improving cognition*
Setareh Shayanfar, Andrew Park, Bryan Tsui, Mark Reinhardt, Nathalie Manuel, Peter Graf, Tyson Miao, Zorry Belchev, University of British Columbia

Older adult's cognition is improved by training with tasks that require sustained attention and concentration. The present study aimed to validate a new task, an iPad variant of the arcade game "Whack-A-Mole" designed to be more entertaining and motivating than traditional n-back tasks. Participants completed a battery of cognitive tasks, an n-back task and Whack-A-Mole games. The results showed significant correlations between n-back and Whack-A-Mole performance, as well as between these tasks and performance on attention/executive function tasks. Future research will explore whether training with the Whack-A-Mole game and with n-back tasks will produce similar cognitive improvement in older adults.

155. *Let's play the blame game, sir: The effects of social hierarchy on the attribution of blame for memory failures*
Randip Gill, Michelle Crease, Peter Graf, University of British Columbia

People make different interpretations about the causes of prospective and retrospective memory failures. To examine the possibility that these interpretations are influenced by the social status of the protagonist of each failure, participants read vignettes describing memory failures committed by people varying in social status, and then they rated potential causes for each failure. Overall, higher status individual's memory failures were rated as more serious and were rated as more likely being due to personality factors if they were retrospective rather than prospective. Interestingly, when participants and protagonists shared social status, blame for memory failures was attributed to external causes.

156. *The role of distracter items on source accuracy in 4-year-olds*
Taeh Haddock, Suzanne Hala, Lee-Ann McKay, University of Calgary

This study examined the influence of distracter items on source monitoring accuracy in 4-year-olds. Sixty-six children participated in one of three conditions: no-distracter, sequential-distracter, and simultaneous-distracter. Previous studies including distractor items have found that children are more accurate for source, when source and recognition are tested simultaneously rather than sequentially. In our procedure, following an encoding phase wherein children watched a puppet show, children were given a source memory test. Overall, the presence of distractor items did not detract from accuracy scores. We discuss the possibility that inclusion of distractors may even work to boost confidence in making source judgments.

157. *Source and destination memory: Two sides of the same coin*
Annick Tanguay, University of Ottawa; Isabel Lindner, University of Kassel; Heloise Drouin, University of Ottawa; Vessela Stamenova, Rotman Research Institute at Baycrest; Patrick Davidson, University of Ottawa

In a conversation, source memory (SM) involves remembering from whom you have heard something; destination memory (DM) involves remembering to whom you have said something. Initial reports suggested that DM is much poorer than SM, particularly in older adults. We investigated SM and DM by having young and older adults listen to sentences read by, and read sentences to, two examiners (under incidental or intentional encoding conditions). We found relatively small differences between SM and DM, minimal age differences, and significant correlations between SM and DM scores. Overall, the data suggest that SM and DM rely on similar processes.

158. *The effect of distracters on short- to long-term memory translation*
Colleen Brenner, Brianne Glazier, Samuel Rumak, University of British Columbia; Susan Kuo, University of Pittsburgh

Cognitive theories of memory involve a translation of information from active short-term maintenance to long-term memory (LTM) storage. We presented a visual short-term memory (STM) task with either no distracter, an early or a late visual distracter and an unexpected long-term memory task to 91 healthy undergraduates. In the STM task, presentation of a distracter lowered performance, with the late distracter being most detrimental to performance. Results for the LTM task were similar; distracters presented during STM trials decreased the likelihood of recognizing the stimulus in a LTM trial, with late STM distracters being the most detrimental to LTM performance.

159. *Is variety the spice of memory? Evaluating the encoding variability hypothesis*
*Mark J. Huff, Glen E. Bodner, University of Calgary

We examined whether encoding variability can improve recall and/or recognition when items are studied once in an item-specific processing task (e.g., mental imagery or pleasantness ratings) and once in a relational-processing task (e.g., category sorting or narrative construction), rather than in the same task twice or in two tasks that recruit the same type of processing. We obtained some support for the benefits of processing variability, as anticipated, but only when studied items were weakly rather than strongly related. The results suggest that varying the type of processing recruited by encoding tasks may be critical for producing an encoding-variability benefit.

POSTER SESSION 2 (SATURDAY 9:00 – 10:30AM)

Animal Behaviour

160. *Multiple cue use and integration in pigeons (Columa livia)*
Eric L. G. Legge, University of Alberta; Elliot A. Ludvig, Princeton University; Christopher R. Madan, Marcia L. Spetch, University of Alberta

Encoding multiple cues can improve the accuracy and reliability of navigation and goal localization, but may create problems if one cue is displaced and provides information that conflicts with other cues. Here we investigated how pigeons cope with cue conflict by: (a) training them to locate a goal relative to two landmarks, and (b) experimentally varying the amount of cue conflict. Results showed that pigeons tended to integrate both cues

when the amount of conflict was small. However, when the amount of conflict was large, pigeons used information from both cues independently. These results suggest the strategy pigeons use to resolve spatial cue conflict is context dependent.

161. *Diethylstilbestrol Exposure in Helisoma trivolvis*
Christina Mitchell, Mount Royal University

Diethylstilbestrol (DES) is a pharmaceutical endocrine-disrupting chemical last used in North America in the 1970s, but its effects are still found in those exposed prenatally. Physical impacts center on delayed onset in reproductive organs and systems. The current study used a snail model to study behavioural and developmental effects after early exposure. Helisoma trivolvis were observed for 4 months following exposure, including sexual behaviour. Snails treated with a low DES dose experienced a higher hatching ratio, DES-treated snails engaged in less sexual behaviour, and most treated snails attempted to assume a sexually receptive role more than non-treated snails.

162. *The effects of time-out period length and stop trial inclusion on response time adjustments of rats in the countermanding task*
Elysia Mechefske, Jonathan Beuk, Martin Pare, Richard Beninger, Queen's University

The countermanding paradigm assesses inhibitory control by measuring a subject's ability to withhold a primary response when presented with a stop stimulus sporadically (25% of trials). Male Wistar rats trained on this task showed longer response times after erroneous stop trials only when these are followed by a 10-s time-out period. Further, rats produce shorter response times in primary task-only sessions which lack stop trials. Together, these results suggest that response adjustment in rats is particularly sensitive to reward contingency, maximizing reward probability by avoiding costly time-outs. (Funded by NSERC)

163. *Responding for ethanol-associated conditioned reinforcers: A possible role for incentive salience*
Rayan Tabara, Jessica Iannuzzi, Jean-Marie Maddux, Nadia Chaudhri, Concordia University

The ability of ethanol- or sucrose-paired conditioned stimuli (CSs) to function as conditioned reinforcers was investigated. Non-water deprived rats were trained to associate a 10-sec CS with ethanol (Exp. 1) or sucrose (Exp. 2), and then tested for conditioned reinforcement using the acquisition-of-a-new-response paradigm. Although ethanol- and sucrose-associated CSs were predictive they failed to function as conditioned reinforcers. When subjects from experiment 2 were re-trained and re-tested following water restriction the sucrose-paired CS functioned as a conditioned reinforcer. Thus, for a predictive Pavlovian CS to also serve as a conditioned reinforcer the unconditioned stimulus may need to be biologically meaningful.

164. *Black-and-white pattern preferences in zebrafish*
Melike Schalomon, Trevor Hamilton, Adam Holcombe, Alicia Pope, Lisa Rimstad, Grant MacEwan University

When studying behaviour in Zebrafish (Danio rerio), its perceptual abilities and preferences for different stimuli must be understood. We tested the naïve preference of adult zebrafish for black-and-white horizontal and vertical stripes and checkerboard patterns in a two-choice preference test. Fish were capable of discriminating between patterns with 1, 5, and 10 mm grid sizes. We also found significant preferences for vertical stripes over other patterns at 10 mm grid size, and significant preferences for horizontal stripes over other patterns at 1 mm grid size. We suggest that preferences for these patterns are associated with increased evolutionary fitness.

165. *Object preference modulation by central oxytocin administration in the female rat*
Dan Madularu, Maria Athanassiou, Dave G. Mumby, Concordia University

Previous studies in prairie voles pointed at a promoting effect of central oxytocin (OT) in partner preference. As shown by Williams and colleagues (1994), OT treatment had a selective effect in bond formation, whereas females receiving control infusions failed to show preference for the familiar conspecific. While past studies offer great insight in the role of OT in partner preference, they do not address the nature of this phenomenon with respect to the nature of the stimulus (conspecific vs. object). The current study is set to investigate the effects of OT on object preference in ovariectomized, female rats. Preliminary results indicate that at short delays, OT promotes object familiarity, whereas saline controls show novelty preference.

166. *Age-related changes in vigilance behaviour: The role of fixed gaze durations*
Petra L. McDougall, Kathreen E. Ruckstuhl, University of Calgary

The young of many species spend a smaller portion of time vigilant when compared to adults. This difference is hypothesized to be the result of increased nutritional demands on growing juveniles. It is unknown whether changes in fixed gaze durations (i.e. directional components that comprise a vigilance bout) follow the same age-related pattern. Furthermore, the nutritional demand hypothesis predicts that vigilance allocation remains constant upon reaching adult size. Examination of bighorn sheep (Ovis Canadensis) gaze duration suggests a continuous increase in gaze duration across lifespan. We therefore recommend considering alternative hypotheses (e.g. cognitive decline) when examining age-related vigilance changes.

Animal Neuroscience

167. *Effects of chronic prenatal MK-801 treatment in the adult male rat*
Maria Athanassiou, Dan Madularu, Dave G. Mumby, Concordia University

The present study hypothesized that prenatal exposure to the noncompetitive NMDA antagonist MK-801 leads to behavioural alterations in adult rats. Eight Long Evan dams were administered either saline (n = 3) or 0.1 mg/kg (SC) MK-801 (n = 5) from GD7 through 19. Maternal behaviour was monitored during the first 14 post-natal days; no significant differences were found. Cognitive assessment was performed using the Novel Object Preference task. Compared to saline-treated controls, MK-801-treated rats failed to show novelty preference at 15-minute and 4-hour delays. Furthermore, MK-801 rats showed increased locomotor activity in response to acute injections of MK-801 and amphetamine.

168. *CB1 receptor knockout mice display barrel cortex-dependent functional deficits*
Michael Chrusch, Richard H. Dyck, University of Calgary

Sensory deprivation results in reorganization of the cortical somatosensory map. Endocannabinoid signalling has been implicated in this process, as sensory deprivation drives synaptic weakening between layer-4 and layer-2 through Cannabinoid Receptor-1(CB1R)-dependent signaling. In this study, we utilized the rodent somatosensory (barrel) cortex to study the role of CB1Rs in experience-dependent plasticity and behaviour. Our findings suggest that CB1R signaling is required to suppress experience-dependent changes in the activity of neurons in the deprived sensory region. Further, using a barrel cortex-dependent task, the texture discrimination task, we show that vibrissae-dependent processing of somatosensory information requires normal endocannabinoid signalling.

169. *Towards developing a novel animal model of problem gambling*
*Catherine Laskowski, Robert Williams, David Euston, University of Lethbridge

It is well established that poor decision making plays a major part in addiction. The majority of studies on problem gambling use human participants, however, in order to gain specific knowledge on the neural mechanisms involved, animal models are required. The study presented here is a key first step towards the establishment of this animal model of gambling addiction, which will focus on the role of prelimbic region (PL) of the medial prefrontal cortex (mPFC) during complex decision-making exercises, evaluated by several psychometric instruments. This model will provide a foundation for further neurophysiological, pharmacological, and computational research into problem gambling.

170. *Corticotropic releasing hormone regulates FAAH activity and anandamide signaling to initiate the hypothalamic-pituitary-adrenal axis*
Kowther I. Hassan, J. Megan Gray, Tiffany T. Y. Lee, Alex B. Kim, Haley A. Vecchiarelli, Matthew N. Hill, University of Calgary

The brain naturally produces a neurotransmitter that has similar stress-reducing effects as cannabis. Under normal conditions this neurotransmitter called anandamide acts as a 'brake' on stress regulating brain regions (Hill & Tasker 2012). We have recently found that during stress experiences, the brain rapidly 'removes this brake' to

facilitate behavioral and endocrine stress responses. Thus, it appears dysregulation of this 'stress inhibiting' system may be linked to anxiety-related disorders.

171. *Chronic fluoxetine treatment reverses behavioural inflexibility but not hypolocomotion induced by injury of medial frontal cortex in mice*
Brendan McAllister, Simon Spanswick, Richard H. Dyck, University of Calgary

The selective serotonin reuptake inhibitor drug fluoxetine has been found to have protective properties when administered following brain injury. However, its potential to promote behavioural recovery requires further characterization. We administered fluoxetine to mice for four weeks following an aspiration lesion of medial frontal cortex (MFC) and conducted a battery of behavioural tests. MFC lesions reduced locomotion in several tests, and induced behavioural inflexibility in the Morris water task. Fluoxetine treatment reversed this inflexibility, but not the observed hypolocomotion. Additionally, it appears that chronic fluoxetine treatment increases the hierarchical rank of mice with MFC lesions relative to untreated cage-mates.

172. *Long lasting effects of transient perinatal fluoxetine exposure on hippocampal neurogenesis*
Simon Spanswick, Michael Chrusch, Richard H. Dyck, University of Calgary

During pregnancy the SSRI fluoxetine is commonly prescribed as a pharmacological treatment for depression. In adults, fluoxetine increases hippocampal neurogenesis. Research assessing the long-term effects of perinatal fluoxetine exposure on hippocampal neurogenesis is sparse. Here, we exposed mice to fluoxetine from embryonic day 15 to postnatal day 12. Fluoxetine-exposed mice had significantly higher levels of neuronal proliferation at P12, and P60, despite cessation of fluoxetine on P12. These findings show that during development, neurogenesis can be up-regulated by fluoxetine, and this transient exposure may be sufficient to induce long-lasting changes in hippocampal neurogenesis.

Cognitive Processes

173. *Evidence for orthographic processing in baboons (Papio papio)? A familiarity-based simulation*
John R. Vokey, University of Lethbridge; Randall K. Jamieson, University of Manitoba

Grainger et al. (2012) taught six baboons to discriminate words from nonwords in an analogue of the lexical decision task. The baboons endorsed novel words more readily than novel nonwords, and had trouble rejecting nonwords that were orthographically similar to learned words---both hallmarks of orthographic processing in skilled human readers. Grainger et al. concluded that orthographic processing precedes language. We show by simulation of the unique learning trajectory of each of the baboons that the results can be interpreted equally well as an example of simple, familiarity-based discrimination of pixel-maps, without orthographic processing.

174. *The automatic nature of parallel response activation in dual-task performance*
Sandra J. Thomson, Scott Watter, McMaster University

The assumption of strictly serial response selection in dual-task performance has been challenged by demonstrations of Task2-to-Task1 backward compatibility effects (BCEs). To investigate these effects further we manipulated Task1 and Task2 response selection stages by altering the number of stimuli in each task. We show that automatic response activation in Task2 depends on the number of trials experienced with specific stimuli; increasing the number of Task2 stimuli decreases the BCE, but increasing the number of Task1 stimuli does not. Our findings highlight the deliberate nature of Task1 response selection and the automatic nature of simultaneous response activation in Task2.

175. *Thurstone Word Fluency test: Scoring, strategies, and relationship to other measures of cognition*
Bob Uttl, Carmela A. White, Kayla Mathison, Vanessa L. A. Beerda, Laura Grant, Mount Royal University

The Thurstone Word Fluency Test (TWFT), requires participants to write down as many words beginning with the letter S as they can in five minutes and then write down as many four letter words beginning with the letter C as they can in four minutes. We examined performance on the TWFT in detail using a large sample of students. Specifically, we examined influence of different scoring methods, use of strategies supporting better performance

(e.g., clustering, switches between clusters, compound word production), and relationship to other individual differences measures including writing speed, processing speed, and verbal intelligence.

176. *The influence of global framing on everyday timing*
Janel Fergusson, Peter Graf, University of British Columbia

Every day we complete a number of tasks that require us to estimate intervals in the range of 1-6 minutes. Previous research has demonstrated that the global framing of a timing task influences the duration of estimates produced, and that timing over the course of 1-6 minutes follows a non-linear pattern. The present experiment addressed whether such manipulations affect the shape of the underlying distribution. Subjects timed intervals from 1-6 minutes while engaged in a secondary task. Global framing was manipulated by instructing participants to stop the current task after a given interval or start the next task on time.

177. *Identifying the sarcastic facial expression*
Cheryl Techentin, Megan Duffy, Samantha Alcock, Kelsey Berntson, Famira Racey, Mount Royal University

The present study examined participants' ability to identify a sarcastic facial expression from a still photograph. Participants were presented with 150 photographs depicting facial expressions of happy, sad, angry, contempt, sarcastic, and neutral. While viewing the photograph, participants were asked to identify which of the expressions they believed was being depicted. To be accepted as a valid depiction of an expression, a criterion was set of 70% interrater reliability. Findings suggest that there is a sarcastic facial expression, however, in the absence of contextual cues, it may often be confused with contempt.

178. *Hemispheric interference, laterality effects, and stimulus presentation in adolescent boys*
Cheryl Techentin, Mount Royal University; Daniel Voyer, University of New Brunswick; Raymond M. Klein, Dalhousie University

The present study investigated the influence of within- and between-ear congruency on interference and laterality effects in two dichotic word/emotion conflict tasks using an adolescent male sample. Participants were presented with words pronounced in congruent/incongruent emotional tones where the two components were presented either bound together as a single stimulus in a single ear (within-ear condition) or separated between two ears (between-ear condition). There were interference effects in both conditions, however, only a LEA for emotion targets was found in the between-ear condition. The ability to reconcile conflicting information between the hemispheres of the adolescent brain is discussed.

179. *Do larger digits really last longer: How numerical context impacts perceived duration*
*Doug Alards-Tomalin, Rebecca Earley, Jason Leboe-McGowan, Launa Leboe-McGowan, University of Manitoba

The contextual influence of numerical order on perceived number duration was investigated. Participants were shown a number string composed of two digits (_89) that was subsequently completed by an order-consistent (789) or order-inconsistent (189) target digit. The target appeared on the left, right, or in the center of the two digits. Results indicated that participants judged large magnitude targets as having longer durations. Additionally, when a target digit appeared on the left side of an order-consistent string, its duration was underestimated. However, the target's location had no influence when placed in an order-inconsistent string.

180. *Knowledge of task type, but not transition type, facilitates proactive control*
Leah Allerdings, Chris Oriet, University of Regina

Interference from irrelevant distractors is attenuated by informative cues indicating whether the relevant dimension will repeat from the preceding trial (repeat cues) or switch to a specific dimension (switch-to cues), relative to cues indicating only that it will not repeat (switch-away cues). Although switch-away cues do not inform transition-type (i.e., switch vs. repetition), they do inform task type by indicating one of three dimensions is irrelevant. In the present study, switch-to and switch-away cues alternated with truly uninformative cues that were uninformative in both transition and task type. Switch-to and repeat cues, but neither switch-away nor uninformative cues, attenuated interference.

181. *Simple neural networks and Bayesian inference: A computational account*
Michael R. W. Dawson, Brian A. Dupuis, Sheldon Jans, University of Alberta

There is a growing movement to replace the logicism of classical cognitive science with a new formalism, probability theory. Inevitably this leads to using Bayesian inference as a norm to which human cognition can be compared. Critics argue that Bayesians study cognition exclusively at the computational level. Some contend that biologically plausible mechanisms for Bayesian theory have not been found. We show that simple artificial neural networks may serve as Bayesian mechanisms. Simulation studies show that these networks generate responses consistent with Bayes' rule. Formal analyses prove that one can translate Bayes' rule into the parameters that describe network structure.

182. *Giant steps in interpreting PDP networks for jazz progressions*
Michael R. W. Dawson, Joshua Hathaway, University of Alberta

If one interprets the internal structure of trained artificial neural networks, then one can find discover new candidates for mental representation. For instance, networks trained to process musical chords frequently represent notes using "strange circles" of major seconds and major thirds. Below we show that these strange circles can be discovered in very simple networks trained to generate two important chord progressions for jazz, the II-V-I and the Coltrane changes. Network interpretation is a reliable source for discovering new formalisms that can be used to represent musical structure, and to inspire new musical creations.

183. *Get out of the corner: Inhibition and the effect of location type and number on perceptron and human reorientation*
*Brian A. Dupuis, University of Alberta

Spatial learning has been frequently investigated using a 'reorientation task' paradigm. However, implementing this typically makes tacit assumptions about spatial information. This has important theoretical consequences: theories of reorientation typically focus on angles at corners, and ignore information present at non-corner locations. We present a neural network model that challenges these assumptions, and compare this model against humans in a virtual environment. Networks and humans alike exhibited reorientation behaviour when goals were not present at corners. Our results suggest that angles are processed similarly to features, acting as "focal points", and the mechanisms governing reorientation may be inhibitory, not excitatory.

184. *Music is the sound of feeling: The interaction of song valence and personality on mood*
Jane A. Fix, Anthony Chaston, Mount Royal University

The current study investigates if listening to sad music will increase positive emotion when feeling sad and if it is dependent on personality differences, specifically, introversion vs. extroversion. Self-reported mood data was collected along with the responses from handedness and personality questionnaires from 61 Mount Royal University Psychology students. The data revealed that those low in extroversion are affected more extremely by emotional music than those high in extroversion and that personal music has a stronger overall effect than classical induction music. These findings impact future music induction studies as well as music therapy for individuals with differing personality types.

185. *Effects of a number game and a spatial game on number line estimation*
*Chang Xu, Jo-Anne LeFevre, Carleton University

The goal of the present study was to examine the effect of ordinal knowledge on number line estimation among young children (3.5 to 5 years old). We conducted a short-term intervention study where children received training on either ordinal or spatial knowledge. The results showed that children in the number group showed improvements on the number line task, especially when an explicit midpoint was provided, whereas children in the spatial group showed improvements on a spatial mapping task. The results indicated that the ordinal knowledge of the number system that is crucial for successful estimation on the number line task.

186. *Basic processes in reading: The role of spatial attention in sub-lexical processing*
Timothy Dunn, Evan F. Risko, University of Memphis; Derek Besner, University of Waterloo

Understanding the role of spatial attention in reading represents an important step in developing a complete explanation of how print is converted into sound. One idea that has drawn interest recently is that spatial attention is involved in grapheme-to-phoneme conversion along the sub-lexical route of dual route models of reading. We provide a test of this idea here by crossing a letter length manipulation with a spatial cueing manipulation in a reading aloud task. Results suggest that any involvement of spatial attention in sub-lexical processing is context dependent.

187. *The acquisition of spatial and non-spatial navigation strategies in a dual-strategy virtual Morris water maze*
Dustin J. H. van Gerven, Thomas Ferguson, Ronald W. Skelton, University of Victoria

Research on navigational cognition has noted large gender differences in the way navigational directions are given, but small gender differences in the way navigational strategies are selected or used. We used a new trial-by-trial probe to investigate acquisition of navigational strategy in a dual-strategy Morris water maze. We found that most participants selected one or the other strategy early in training, with males but not females preferring a spatial strategy. More females than males failed to learn the platform location. These results indicate that the usual gender differences in performance and strategy are due to a subpopulation of females.

188. *Effects of Age and Emotional Valence on Item-Directed Forgetting and Source Attribution*
*Sara N. Gallant, Lixia Yang, Ryerson University

Previous research suggests an age-related positivity effect in cognition, with older adults showing a preference toward positive and away from negative information in attention and memory. The current study examined whether this age-related preference would affect intentional forgetting and source attribution of emotional information. To this end, we compared older and younger adults on item-directed forgetting and source identification (i.e., tagging items as 'remember', 'forget', or 'new' at recognition) of positive, negative, and neutral words. Older adults showed reduced directed forgetting for positive words and impaired source attribution for emotional words, while younger adults' performance was not affected by emotion.

189. *Effects of videogame playing on social cognition*
Ruth L. Diaz, Carina G. Chiu, Ulric Wong, Jennifer L. Prentice, Vina M. Goghari, University of Calgary

This study examined the effects of chronic videogame playing on facial emotion recognition. Participants completed a facial emotion recognition task, an experimental control task (gender recognition), and questionnaires assessing their videogame consumption, personality, and mood. Preliminary analyses indicate that playing two or more hours of videogames a day can affect the recognition of disgust and fearful faces, with gamers being less accurate at identifying disgust faces, and more accurate at identifying fearful faces than non-gamers. The findings suggest that chronic videogame playing could potentially affect emotion recognition, and more research is needed to explore this possible impact on social cognition.

190. *Are all stereotypes created equal? Event-related potentials evoked during schema violation*
Patrique Brochu, Chris Schubert, Joël Dickinson, Laurentian University

Schema violation has an impact on cognition. Previous research using reading tasks has shown that the impact is not the same for male and female characters. The Implicit Association Test (IAT) has been used to investigate schema violation, but no study has effectively investigated gender differences. Therefore, this study specifically investigates the factors of participant and character gender. Event-related potentials (ERPs) were used to investigate the cognitive impact of schema violation while participants completed a gender IAT. Significant effects were found for participant gender and character gender in later, exogenous components including the N400 and LPP.

Language and Reading

191. *Grammatical and lexical aspect constraints on imagined events*
Jeffrey Hong, Todd Ferretti, Rachel Craven, Rachelle Hepburn, Wilfrid Laurier University

Participants in this research read sentences that contained either accomplishments (build) or activities (run) that were grammatically marked as ongoing or completed (I was running / I ran). Slow cortical potentials were recorded while participants imagined the events described in the sentences for eight seconds. Results show that participants had less difficulty imagining events when the temporal properties of the two forms of verb aspect matched (imperfective activities, perfective accomplishments) versus mismatched (perfective activities, imperfective accomplishments). Responses to questions about the imagined events also demonstrated that grammatical and lexical aspect influenced the content and temporal perspective of those events.

192. *Children's sensitivity to phonological context in spelling*
Derrick C. Bourassa, Meghan Bargen, University of Winnipeg

An important aspect of spelling development in English is graphotactic knowledge (e.g., particular spellings are influenced by the phonological characteristics of the neighbouring elements within words; Bourassa & Treiman, 2010). The present study examined children's knowledge of the impact of syllabic stress on the use of single versus double consonants in a pseudoword spelling task. Analyses revealed sensitivity to be a relatively late developmental achievement. Our findings underscore the heterogeneity of spelling development, and point to the need for further analyses of children's sensitivity to the various complexities that exist in the English language.

193. *What is a terpsichorean? Word meaning facilitates reading and spelling*
Nicole J. Conrad, Alisha Hiscott, Saint Mary's University

A reciprocal relation exists between vocabulary and literacy skill. The lexical quality hypothesis (Perfetti, 2007) suggests that with increasing literacy skill, a word's orthographic, phonological, and semantic information become increasingly integrated in the mental lexicon. As a result, knowing the meaning of a word facilitates access to that word's representation in memory. We predicted that knowing the meaning vs. not knowing the meaning of a word would facilitate access to the mental lexicon as indexed by increased accuracy and speed for both reading and spelling. Skilled adults produced meanings for 52 low frequency words immediately after reading or spelling each word. Preliminary results support the hypothesis, and have implications for models of skilled reading and reading acquisition.

194. *Hemispheric processing of congruent/incongruent features of emotional speech sounds and sarcastic speech*
Cheryl Techentin, Alysha LaRosee, David R. Cann, Mount Royal University

The present study examined two dichotic listening tasks (i.e., a word/emotion conflict task and dichotic sarcasm task) to determine if processing sarcastic speech phrases produces the same pattern of hemispheric laterality effects as isolated words spoken in incongruent emotional tones. The results demonstrated a significant right ear advantage for congruent words/emotional tones and sincere speech phrases, whereas a left ear advantage was found for incongruent words/emotional tones and sarcastic speech phrases. These findings suggest that sarcastic speech may present a naturally occurring example of hemispheric conflict. Discussion focuses on hemispheric integration and segregation in processing congruent/incongruent features of emotional speech.

195. "Survival of the grouped" or three's a crowd? Repetition blindness in groups of letters and words
Andrea Jackson, Lori Buchanan, University of Windsor

When stimuli are presented rapidly to viewers, repetitions are often undetected, a phenomenon called repetition blindness (RB) (Kanwisher, 1987). Groups of items may be immune to this phenomenon. Groups of linguistic stimuli were presented and a judgment of frequency was required. Collection of reaction times allowed for analysis of participants' processing strategies. When items were presented sequentially, RB and an item enumeration strategy were observed. When items were presented simultaneously, participants who exhibited greater accuracy at detecting the group of items seemed to use a familiarity-based strategy and those who exhibited RB seemed to use an item enumeration strategy.

196. *Barking at emotionally-laden words: The role of attention*
*Christie Haskell, Jennifer Stolz, Jerrica Little, University of Waterloo

Research challenging the view that the processes involved in visual word recognition (VWR) are automatic is growing. Findings derived from the emotional processing of faces suggest that negative stimuli promote quick processing. We investigated whether negative words are afforded priority processing in VWR compared to positive words. Two experiments are presented that manipulated the lexicality and valence of the target and distractor stimuli, the validity of a spatial pre-cue, and the presence of a distractor item. Consistent with the view the VWR is not automatic, negative words benefited from the accurate direction of spatial attention.

197. *Readers' reactions to translated narratives*
Helena Henriques, Marisa Bortolussi, Peter Dixon, University of Alberta

A controversy in translation studies is the extent to which a translator should "naturalize" a narrative to match the background of the reader. The present study provides an empirical examination of whether different translation strategies actually affect readers' reaction to the plot and the characters. Subjects read versions of a translated story in which proper names of people and places were either "foreignized," or "naturalized." The results suggest that although readers identify the foreignized stories as more culturally distant, this reaction has little discernible impact on their evaluation of the characters or plot events.

198. *The multi-dimensional nature of orthographic knowledge: An ERP study*
Nicole E. Webb, Nicole J. Conrad, Saint Mary's University

Skilled reading results from the coordination of multiple types of knowledge, including orthographic knowledge. Orthographic knowledge has at least two dimensions, word-specific knowledge (e.g., spellings of specific words or sub-word units) and general orthographic knowledge (e.g., legal letter combinations, letter position and recurrence frequency). Both types of orthographic knowledge contribute unique variance to reading skill (e.g., Conrad, Harris, & Williams, 2013). Using stimuli from traditional orthographic knowledge tasks (e.g., words and nonwords), participants completed a lexical decision task while electrophysiological responses (ERP) were recorded. Preliminary results provide converging evidence for a multi-dimensional conceptualization of orthographic knowledge.

199. *Mental action verb processing: An ERP investigation*
Karly J. Dudar, Sean Thomas, Rachel Elliott, Joël Dickinson, Laurentian University

Imaging has revealed that retrieval of verbs with verifiable products ('throw, kick') activate language areas as well as the motor cortex responsible for the action described. An exploratory comparison of eye related verbs with no verifiable product ('observe') to mouth related verbs with verifiable products ('shout') has revealed a similar activation pattern. The present study used words that were suitable across two modalities (e.g. you can 'perceive' both through vision and audition) and compare them to themselves under differing contexts of auditory and visual verbs. Although a modality main effect was found, it was not in the hypothesized components.

200. *Appearance and reality in real-time referential processing*
Mindaugas Mozuraitis, Craig G. Chambers, Meredyth Daneman, University of Toronto

Eye-tracking was used to investigate listeners' ability to manage knowledge about the identity of visually-misleading objects as a referring noun (yogourt) is heard in an unfolding spoken sentence. When the identity of misleading competitors sharing onset sounds (yo-yo that looks like a baseball) was first demonstrated to participants, listeners exhibited equivalent momentary consideration of competitors relative to perceptually-apparent competitors ("obvious" yo-yo), but not without pre-familiarization. Crucially, a referential communication task involving two interlocutors showed listeners have extreme difficulty differentiating their private object-identity knowledge from perceptual knowledge available to the other interlocutor in the early moments of referential interpretation.

201. *Cna Yuo Raed Tihs? Partial cue reading and spelling ability*
Tru E. Kwong, Malinda Desjarlais, Megan L. Duffy, Mount Royal University

Good readers differing in spelling proficiency were compared on an orthographic matching task. Data was analyzed both using ANOVA, with participants divided into "good" versus "poor" spellers, and correlation, checking for

continuity in performance. Accuracy was similar across spellers, but better spellers performed the matching task more quickly. Correlations indicated that participants fell into a continuum, rather than discrete groups, with increases in spelling ability correlating with decreases in reaction time on the matching task. This indicates that "unexpectedly poor spellers" may not represent a distinct group, but the extreme end of a continuum of spelling ability and reading strategy.

Other

202. *Play to win! Situationally-induced motivational state influences gambling behaviour*
Aimee Skye, Alexandra Kent, MacEwan University

Regulatory Focus Theory suggests goal-directed behavior and experiences differ when fulfilling advancement or security needs. Advancement or promotion concerns encourage focus on gains and elated reaction to them, security or prevention concerns encourage focus on losses and calmer reaction to gains. The current study examined how regulatory focus influences gambling. A word search task primed promotion or prevention motivation. Participants then played a computerized slot machine, knowing they could stop any time and remaining credits translated into $250 draw entries. Promotion motivated participants gambled twice as long, and tentative analyses suggest motivation may influence persistence through losing streaks.

203. *Student Evaluation of Teaching (SET) ratings and student learning are not related: Published meta-analyses revisited*
Bob Uttl, Carmela A. White, Daniela Wong Gonzalez, Mount Royal University

Student Evaluation of Teaching (SET) ratings are used to evaluate faculty's teaching effectiveness. The evidence cited in support of this practice are several meta-analyses of multi-section studies that reported correlations between SET and student learning. We reviewed these meta-analyses and for each of them plotted reported SET/Learning correlations as a function of study sample size. The plots revealed that many small sample studies reported large SET/Learning correlations but large sample studies reported only negligible or zero correlations. In contrast to their claims, the data published in prior meta-analyses indicates that students do not learn more from more highly rated professors.

204. *How to increase your student evaluation of teaching ratings: Faculty's advice*
Bob Uttl, Carmela A. White, Daniela Wong Gonzalez, Christine C. M. Slaunwhite, Mount Royal University

In many universities, student evaluation of teaching (SET) ratings have become the sole focus of teaching evaluations even though SETs do not correlate with student learning. In turn, high proportions of faculty admit to behaviors that reduce learning but increase SETs (e.g., reducing workload). We surveyed over 1,400 faculty and found that (a) faculty believe that factors not promoting student learning and/or beyond their control (e.g., easy grading, teaching small classes) increase their SET ratings and (b) faculty advise their colleagues to be entertaining and easy on students, in addition to being prepared/organized, clear, and fair.

205. *Science and politics in the United States: Why you should be worried*
*Gordon Pennycook, James A. Cheyne, Nathaniel Barr, Derek J. Koehler, Jonathan A. Fugelsang, University of Waterloo

We investigated the sources of anti-science attitudes in a large sample of U.S. residents. Religious belief, religious participation, and social conservatism emerged as strongly significant independent predictors of lowered acceptance of evolution, climate change, and lowered trust in scientists. Differences in cognitive ability, cognitive style, and demographics (e.g., education) contributed very little to the prediction of anti-science attitudes. These findings indicate that anti-science attitudes are most strongly related to prior beliefs and ideology as opposed to differences in education or intelligence. This is troublesome for proponents of science because beliefs and ideology are not easily or ethically changed through policy.

206. *Meta-analysis of meta-analysis: Do meta-analyses conform to PRISMA and MARS guidelines*
Daniela Wong Gonzalez, Bob Uttl, Kayla Mathison, Mount Royal University

We examined the conformity of published meta-analyses with the Preferred Reporting Items for Systematic reviews and Meta-Analysis (PRISMA; Moher et al., 2008) and Meta-Analysis Reporting Standards (MARS; APA, 2008) guidelines for reporting meta-analyses. Our findings indicate that adherence to PRISMA and MARS guidelines for reporting meta-analyses is generally poor. Many meta-analyses do not provide such basic information as a complete and replicable search strategy, individual study characteristics, and individual study effect sizes. In turn, serious deficiencies in reporting of meta-analyses render many published meta-analyses non-transparent, non-verifiable and non-replicable.

207. *"Mystery" and environmental preference*
Vedran Dzebic, Colin Ellard, University of Waterloo

Environments which possess "mystery", suggesting that additional exploration will lead to new information, have been cited as predicting environmental preference. In the present study, we examined whether the number of potential areas for further exploration or the amount of possible visible spaces drove ratings of mystery. Findings indicate that mystery is influenced primarily by the number of possible areas of exploration, rather than by the amount of visible spaces. Regarding the influence of mystery on preferences, it appears that context may play an important role, so that mystery is preferred in certain contexts and not in others.

208. *This is your brain on psychology: The use of wireless EEG technology in teaching undergraduate psychology*
Peter C. Stewart, Memorial University of Newfoundland

It is increasingly important to train or at least expose undergraduate psychology students to current cognitive neuroscience methodologies although most instructors are limited in their ability to provide such tangible experiences due to resource limitations. Recent advances in electroencephalography (EEG) technology now make it possible to partially rectify this deficiency. Suitable for any level of experience, this EEG system is affordable, manageable, and reliable, and is perfect for a classroom demonstration. Two simple studies report the utility of the technology for student learning and suggest that the incorporation of this technology into a lecture facilitated learning and stimulated interest levels.

209. *Wii should team up: The role of teammates and difficulty on psychological flow levels during video game play*
Peter C. Stewart, Joshua Penny, Memorial University of Newfoundland

Two psychological constructs, flow and presence, have been identified as positive modulators of task performance and task engagement. How task difficulty and playing with a teammate interacted while gaming to influence these constructs was examined. Participants (n=32) played both easy and difficult games, with or without a teammate and completed flow and presence scales. A main effect of task difficulty on psychological flow levels and a significant Difficulty x Teammate interaction ($p < .05$) revealed that participants experienced higher levels of flow in the easy game and when playing with a teammate in the difficult game condition.

210. *From high-school champ to university chump*
Carolina Leon, Nina Siripun, Peter Graf, University of British Columbia

Even though only the brightest high-school students are admitted to university today, a substantial proportion of them flounder and fail. To gain insight into this unwelcome transformation, we investigated the skills and tools students use for managing assignments and deadlines. Results showed A-students are less likely than others to use electronic devices, more likely to use reminder tools when learning about new assignments, & less likely to underestimate the requirements of assignments. Also, first-year students are more likely than other students to use sticky notes & electronic reminding devices, as well as more likely to rely on parents and friends.

211. *On the evolution of handedness: Evidence for feeding biases*
Jason Flindall, Claudia Gonzalez, University of Lethbridge

Right- and left-handed individuals were required to reach out and grasp one of three different sized food items in order to either eat the item or place it on a container below their chin. Grasping kinematics were assessed for right- and left-handed movements. Results demonstrated a right-hand kinematic advantage for the feeding task as

participants displayed smaller maximum grip apertures. The results provide evidence that handedness may have originated from feeding biases.

212. *Does size matter? Investigating the effect of three sizes of touch-screen buttons on typing performance and driving performance*
Benjamin Cortens, University of Guelph

As in-vehicle touch-screens become more common, the user interface becomes more important. This research examines the effect of key size for three touch-screen keyboards on typing performance and driving performance. It investigates the effect of the dual task of driving while typing compared to both single task driving and to single task typing. Findings suggest that smaller keyboards increase the risks associated with driving while interacting with an in-vehicle touchscreen. Smaller keys require more time and are more error prone. Effects of dual task driving plus text entry on lane keeping behaviour and hazard reaction time are also discussed.

213. *The effects of personal song meaning, singer gender and musical training on spontaneous facial and head movement while singing: An exploratory investigation*
Gillian R. MacDonald, Annabel J. Cohen, University of Prince Edward Island

Singing is typically regarded in terms of acoustics and aesthetics; however, bodily movement often accompanies it. The present study explored the facial motor concomitants of singing as a function of personal meaning of song, and level of musical training and gender of the singer. An 18-item facial movement scale was developed for the study; 4 judges rated performances by 12 singers of a favourite and an assigned song (Brother John/Frère Jacques). Ratings on the majority of the scale items were significantly influenced by one or more of the three variables, recommending the viability of this approach for future studies of singing and gesture.

214. *How research ethics boards are making it increasingly difficult to conduct psychological science: Some major issues & potential solutions*
Angie Birt, Kaitlin Baur, Phillip Aucoin, Mount Saint Vincent University

Although ethical conduct of research is imperative, it is becoming increasingly difficult (and even impossible) to conduct research within some areas of psychology. Although policies (e.g., TCPS-2) help ensure research is carried out according to specified ethical standards, many REBs take liberty with interpreting policy guidelines. Drawing from previous research as well as presenting feedback received from a REB expressing "concerns" about utilizing potentially controversial artworks to evoke emotion, issues including defining minimal risk, identifying vulnerable participants, coercion, accusations of Criminal Code violations, and academic freedom are discussed. Possible causes of escalating restrictions and potential preventative solutions are explored.

POSTER SESSION 3 (SATURDAY 5:00-6:30PM)

Attention

215. *Mind wandering and performance: The efficiency of attentional resource distribution*
David R. Thomson, Derek Besner, Daniel Smilek, University of Waterloo

In the present work, we explore the prevalence and consequences of mind wandering while participants engage in reading aloud and color naming. We find that mind wandering rates are quite high and are negatively predicted by the executive/attentional demands of the primary task. Surprisingly, we find almost no performance deficits associated with self-reported mind wandering. We discuss our findings with respect to attentional resource accounts of mind wandering (Smallwood & Schooler, 2006), and argue that individuals constantly adjust attentional resource allocation in order to maximize the pursuit of both external (task-related) and internal (task-unrelated) goals.

216. *Combined attention: A novel way of conceptualizing the links between attention and behavior*
Mathieu Landry, Jelena Ristic, McGill University

Attention is important for behavior. We show that complex behavior involves joint activity in multiple attention systems -- a process that we call combined attention. We demonstrate that combined attention (i) emerges when multiple attention systems are engaged by a single behaviorally relevant stimulus, (ii) involves flexible allocation of processing resources, and (iii) is expressed similarly in manual and oculomotor measures. These data provide a new framework for linking attention and behavior and suggest an important role of combined attention in maintaining atypical behaviors that depend on combining the meaning of the incoming stimuli with individual goals (e.g., addiction).

217. *Dual task backward compatibility effects are episodically mediated*
Maria Giammarco, Sandra J. Thomson, Scott Watter, McMaster University

The presence of backward compatibility effects in the Psychological Refractory Period paradigm provides evidence of parallel response activation during dual-task processing. Two potential mechanisms of automatic parallel Task2 response activation have been suggested: the “transient link” model, dependent on Task2 rules maintained in working memory; and the “direct link” model, dependent on Task2 response information retrieved from episodic memory. We provide evidence in favour of the episodic direct link model by training and then modifying Task2 response mapping in a PRP task, and demonstrating proactive interference from previously learned stimulus-response associations, selectively for conditions with high informational overlap.

218. *Stimulus modality and attention sharing in time estimation: A dissociation*
Andree-Anne Ouellet, Claudette Fortin, Université Laval

Expecting a signal during an interval production or producing simultaneously two time intervals both lengthen time productions, presumably because of attention sharing in both cases. Participants produced two partially overlapping 2.5-s intervals defined by auditory or visual stimuli. The overlap between intervals varied with SOA (750, 1250, 1750 ms). Results showed that 1) first productions lengthened with longer expectancy duration (SOA), a distraction effect stronger in the visual modality; 2) within both modalities, second productions lengthened similarly with longer overlap. These results suggest that attention sharing due to expectancy in timing or to simultaneous temporal processing rely on different processes.

219. *Simon effect in 3D space*
Mariapaolo Barbato, University of Calgary

The Simon Effect (SE) (faster and more accurate responses in presence of correspondence between the task-irrelevant position of the stimulus and that of the effector) has been consistently observed along the horizontal and vertical planes while little is known about the existence of the SE on the z-plane. Twenty-four participants performed a Simon task with 3D images and in-depth arrangement of the response keys. Results indicated a main effect of 3D space, but the absence of SE along the z-plane. We discuss possible limitations of our study and encourage future research to further evaluate the presence of SE in depth.

220. *Does video-game playing improve spatial attention*
James William Patten, Thomas M. Spalek, Simon Fraser University

Attention researchers have hypothesized that individuals who play action-oriented video games may exhibit improved spatial attention as a result of practice. The extant literature, however, provides evidence both for and against this hypothesis. The present study was designed to address this controversy. Both video-game players and non-video-game players were tested on two flanker-interference tasks and a useful-field-of-view task. Relative to non-players, video-game players showed improved performance in only one of the flanker tasks. This mirrors the controversy in the literature.

221. *Do different paradigms assess the same underlying process in attentional capture*
Diana F. Pricop, Matthew R. Yanko, Thomas M. Spalek, Simon Fraser University

In recent decades, a debate has emerged as to whether attentional capture is a result of top-down (Folk, Remington & Johnston, 1992), or bottom-up (Theeuwes, 1991) processes. Many studies aimed at resolving this debate have used different methodologies assuming that they measure the same underlying mechanism. As a first

step in testing this assumption, we examined attentional capture by means of two paradigms commonly used in the literature: Visual Search and Rapid Serial Visual Presentation. Performance on the two tasks to be significantly correlated with one another, suggesting that they assess the same underlying process in attentional capture.

222. *The effect of spatial attention on target categorization time: Does prior trial history matter?*
Darcy White, Jennifer Stolz, Derek Besner, University of Waterloo

Experience matters in real life, yet in the lab we typically fail to consider the effects of prior trial history on performance. Two spatial cuing experiments (exogenous and endogenous cuing) assessed whether the nature of the prior trial affects performance. Linear mixed effects modeling revealed that current trial response times (RTs) were affected by prior target, prior target location, and prior cue validity. Clearly, the difference in RT to a target preceded by a valid or invalid cue does not reflect a pure measure of spatial attention.

223. *Does self-reported attentional control predict performance on behavioural measures of attentional control? Evidence from the antisaccade task*
Caitlin Wright, Keith S. Dobson, Christopher R. Sears, University of Calgary

The Attentional Control scale (ACS; Derryberry & Reed, 2002) is a self-report measure of individual differences in attentional control. Despite its widespread use, little is known about the convergent validity of this scale with behavioural measures of attentional control. The present study examined the associations between the ACS, a measure of working memory (Operation Span task), and the antisaccade task, which evaluates the ability to suppress a reflexive eye movement toward a distracting stimulus (hence requiring attentional control). Results and implications for future research are discussed.

224. *Spatial attention biases in visually-guided grasping amongst healthy adults*
Natalie de Bruin, Claudia Gonzalez, University of Lethbridge

Work from our laboratory has shown that visually-guided grasps towards left extra-personal space occur less often, and usually last, when compared to grasps elsewhere in space. We investigated whether this phenomenon has its origin in spatial biases by tracking eye movements. Participants assembled models using building blocks, with blocks distributed in each quadrant of the workspace. Eye movements mirrored patterns of hand use. Participants grasped and allocated gaze to left extra-personal space later in the task. These findings demonstrate that biases in space use for grasping are attentional in origin and suggest an inherent tendency to neglect left extra-personal space.

225. *The effects of valid, invalid and neutral endogenous and exogenous cues on target localization*
Shelby L. Siroski, Chris Oriet, University of Regina

Unlike endogenous cues, exogenous cues capture attention. Capture may not occur when valid endogenous cues are available. Saccades were made to a target in one of four locations. In a target-localization task, 65%-valid/35%-invalid endogenous cues were paired with 50%-valid/50%-invalid exogenous cues or, for other subjects, 65%-valid/35%-neutral endogenous cues were paired with 50%-valid/50%-neutral exogenous cues. Valid exogenous cues facilitated localization only when accompanying neutral endogenous cues. This suggests that attention can be captured by irrelevant exogenous cues only when attention is not committed elsewhere.

226. *Is attention biased toward or away from mood-congruent stimuli?*
Calandra Speirs, Amanda Fernandez, Kristin Newman, Christopher R. Sears, University of Calgary

Does a transient negative mood increase or decrease attention to negative stimuli? In this study, we used a negative mood induction (MI) to look for evidence of a mood-congruent effect on the allocation of attention. Participants viewed sets of negative, positive, and neutral images while their eye gaze was tracked and recorded, to assess the amount of attention each type of image received over an 8 second presentation. Attention to the images was examined before and after the negative MI. In contrast to other studies (e.g., Isaacowitz et al., 2008), we found that attention was allocated in a mood-incongruent manner.

227. *Allocation of attention during dual tasks in PTSD population and healthy controls*

*Dhrasti K. Shah 1,2; Colin Cameron 3; Dylan Smith 1,2; Natalia Jaworska 4; Crystal Blais 1,5; Verner Knott; 1,2,5; Charles A. Collin 1, 1. University of Ottawa, 2. University of Ottawa Institute of Mental Health Research, 3. Brockville Mental Health Centre, 4. University of Calgary, 5. Carleton University

Event-related potentials and behavioural performance measures were recorded in 18 patients with PTSD and 18 healthy controls (HC) to examine the effects of single (attending to auditory) and dual (attending to both auditory and visual modalities) processing load on attention allocation. Larger P300 amplitude was found during single compared with dual task condition. Patients compared with HC showed reduced accuracy and increased false alarms only during the dual task condition. PTSD patients showed increased accuracy and faster response during single versus dual task condition. Results indicate that patients have more difficulty distributing attentional resources.

Human/Cognitive Neuroscience

228. *When is a mental set needed? A double dissociation between alphabetic/logographic formats and tasks (reading aloud/parity) as revealed by granger analysis of fMRI data*
Derek Besner, University of Waterloo; Shannon O'Malley, University of Montréal; Sherif Soliman, James Danckert, Britt Anderson, University of Waterloo

A critical issue in experiments concerns what subjects are supposed to do. We suppose that particular stimuli are more strongly associated with some goals (tasks) than are others. In particular, reading aloud is more strongly associated with alphabetically displayed words (e.g., ONE) than are logographs (e.g., 1) whereas such logographs are more strongly associated with parity judgments than are alphabetically displayed words. Granger analysis of fMRI data provides compelling support for this hypothesis: The conjunction of stimulus type and task strongly predicts the strength of association between activation in occipital lobe and frontal areas associated with goal maintenance.

229. *Route preference in urban spaces: Evidence for a common mechanism*
Kevin R. Barton, Colin Ellard, University of Waterloo

While navigating the world, we often unintentionally follow similar routes to those of other people based on how the building or city around us is organized. To investigate the limits of this phenomenon, participants navigated through two virtual environments with different structures. Navigation behaviour was compared against measures of cognitive bias, propensity for inattentiveness and memory failures, and spatial orientation abilities. Results clearly indicate a consistent influence of the organization of space on navigation behaviour. However, this effect was associated most strongly with increased attentiveness. These findings suggest that self-organizing patterns in navigation may correspond to specific cognitive factors.

230. *A word regularity effect for pictures: Evidence from reaction time and response duration*
Layla Gould, Kathryn Anton, Ron Borowsky, University of Saskatchewan

We examined naming reaction time (RT) and response duration (RD) for exception (EXC) and regular (REG) words, and their corresponding pictures. The RT effects showed that REG words are named faster than EXC words, and the opposite effect for pictures. The RD effects showed that REG words produced longer RDs than EXC words, and the same effect for pictures, suggesting that duration is shorter for items that are identified as 'whole-words', and that pictures activate their corresponding orthographic representations. Implications for models of how word and picture processing interact are discussed.

231. *Effects of stimulus type, testosterone, and strategy on sex differences in mental rotation accuracy*
Caitlin M. Hunter, Laurie Sykes Tottenham, University of Regina

Sex differences on mental rotation tasks (MRTs) are reduced/negated if stimuli resemble human bodies. We examined how sex, testosterone, and strategy related to body and non-body MRT accuracy, and how self-reported empathy related to strategy use and body MRT accuracy. Sex differences were found for block and block-body stimuli, but not realistic-body stimuli. A body mimicry strategy was associated with higher accuracy in both sexes, and empathy was positively correlated with block-body accuracy in women only. Testosterone was not related to

MRT accuracy. Results suggest sex differences on MRTs can be negated using body stimuli, with mimicry facilitating performance.

232. *Prenatal sex hormone estimator correlated with empathy and facial mimicry in woman*
Emilie G. Kossick, Laurie Sykes Tottenham, Denis P. Alfano, University of Regina

Empathy involves facial mimicry and emotion processing, allowing for understanding of another's mental state. The brain regions underlying these processes have high concentrations of sex hormone receptors. This study aimed to determine if a prenatal sex hormone estimator, the 2D:4D ratio, was related to facial mimicry, self-reported empathy, and emotion recognition in women (n = 37; ages 18-25 years). Significant positive correlations were found between the left hand 2D:4D ratio and mimicry, self-reported empathy, and emotion recognition. These results suggest that low prenatal testosterone exposure is associated with better emotion processing in women.

233. *Fire the lasers! Performing line bisection in extrapersonal space*
Bianca Hatin, Laurie Sykes Tottenham, Chris Oriet, University of Regina

Laser line bisection (LLB) is a newer visuospatial task that, unlike pen-and-paper line bisection, can be performed in extrapersonal space. We examined the utility of LLB by manipulating factors known to influence visuospatial biases: elevation, lateral position, and distance. In contrast to the leftward biases typical of peripersonal line bisection, we observed an overall rightward bias, with stronger rightward bisections at low elevations, farther distances, and rightward lateral positions. The findings are consistent with those observed in pseudoneglect studies, and mirror those seen in neglect patients, suggesting that LLB is a useful task for studying visuospatial biases in extrapersonal space.

234. *Move your eyes as much as you want! ICA-based correction of EEG contaminated by eye movements in a visuospatial attention and memory task*
Sébrina Aubin, Brandi Lee Drisdelle, Université de Montréal; Alexandra Corneyllie, Lyon Neuroscience Research Centre; Pierre Jolicoeur, Université de Montréal

Eye movements are a concern in electroencephalography research. To decrease contamination from saccadic activity, strict rejection criteria are often imposed during analysis, resulting in the rejection of a substantial proportion of trials. This study demonstrates the usefulness of a very rapid correction method based on Independent Component Analysis (ICA) computed on a strategically selected subset of the data, which is then used to eliminate ocular artifacts for the entire dataset using signal-space projection. Results show that the portion of the ERP that was significantly distorted by saccadic movement towards the target can be effectively corrected with the ICA correction procedure.

235. *Robustness of the bidirectional associative memory to sparse connectivity*
Christophe Tremblay, Maxime Dorville, Kaia Myers-Stewart, Sylvain Chartier, University of Ottawa

Learning and recalling various types of associations, while routinely accomplished by humans, is difficult to reproduce using artificial intelligence systems. The Bidirectional Associative Memory (BAM) is a connectionist model that has shown to successfully model such tasks. However, this model has always been investigated under optimal conditions. In this paper, the influence of spreading-activation and connection sparseness in a BAM is studied. Results showed that even under variability, the performances of the BAM remain unaffected. This study suggests that the BAM is more biologically plausible as it can encompass realistic settings seen in the brain, demonstrating promising cognitive proprieties.

236. *Aerobic exercise induced hippocampal plasticity in youth with major depression*
Allegra K. Courtright, Natalia Jaworska, Nicole Culos-Reed, Frank McMaster, University of Calgary

Background: Aerobic exercise has shown promise in reducing symptoms and promoting brain plasticity in major depression (MDD). A relationship between symptom severity, hippocampus volume, and N-acetyl-aspartate [NAA] levels has been shown, however, their relation to VO2 has been underexplored. Methods: Unmedicated, inactive

adolescents with MDD are being recruited to undergo neuroimaging and fitness assessments at baseline and following a twelve-week exercise intervention. Results: We expect maximal neurobiological effects in individuals with greatest aerobic capacity and to correlate positively with depression scores. Conclusions: This project expands our knowledge on the clinical and neurobiological effect of aerobic exercise on depression in adolescents.

237. *The cerebellar vermis in bipolar disorder*
Devin J. Mahnke, University of Calgary

Bipolar disorder (BD) often first presents during adolescence, and is associated with numerous neurophysiological abnormalities. Lithium, a commonly prescribed treatment for BD, is also associated with neurophysiological changes, but has been little studied. The cerebellar has previously been found to display volumetric abnormalities in subjects with BD. This study has two aims: first to determine if cerebellar vermis volumetric abnormalities exist in subjects with BD versus healthy controls; and second to determine if lithium directly exerts volumetric effects on the cerebellar vermis. We hypothesize that lithium exerts a hypertrophic effect on the cerebellar vermis, independently of bipolar illness.

238*. Is there a sex difference in reinforcement learning through positive feedback?*
Kelly L. Evans, Elizabeth Hampson, University of Western Ontario

Evidence from reinforcement learning tasks suggests there may be a sex difference in sensitivity to rewarding and/or punishing feedback. To investigate sex differences on tasks involving learning from valenced feedback, young adults were assessed on a probabilistic reversal learning task, modified to provide rewarding or punishing feedback. No sex difference was present in acquisition, but females performed more accurately than males in the positive feedback condition after reversal and this was dependent upon how heavily participants were influenced by external feedback to guide their responses. Therefore, a sex difference may exist in reward sensitivity during certain types of reinforcement learning.

239. *The acquisition of orientation strategies in a dual strategy Morris water maze: An eye-tracking study*
Megan Yim, Ronald W. Skelton, University of Victoria

Previous studies of navigational strategy adoption have indicated that spatial strategies are easier and are adopted before non-spatial strategies. We used gaze position to monitor the adoption of orientation strategies in a virtual environment that segregated spatial and non-spatial cues between upper and lower regions of the display. We found that most participants adopted a spatial strategy and both strategies were adopted early in training, though some participants never developed a clear preference. There were no gender differences. This suggests that strategies are not learned sequentially and that the selection may be an interaction between the individual and the environment.

240. *The influence of anxiety on recognition and memory confidence*
Bethany R. Delleman, Myra A. Fernandes, University of Waterloo

We examined memory and confidence in participants with high and low anxiety. During study, participants encoded words presented visually, followed by either a mathematics test or the Raven's matrices to elevate anxiety. High compared to low anxious participants had poorer confidence in their memory overall. Confidence in correct responses decreased with higher scores on state and trait anxiety scales. While there were no significant group differences in memory, higher anxiety scores were associated with poorer accuracy. This finding has implications for understanding why anxious individuals may be more hesitant when selecting correct responses on written examinations.

241. *Investigating sensory and motor multisensory enhancement in consistent response conditions*
Casey D. Losier, Geneviève Desmarais, Mount Allison University

We conducted two experiments (visuo-tactile and audiovisual) to differentiate between the sensory and motor components of multisensory facilitation. In each experiment, two groups of undergraduates signaled the location of targets (left or right) by pressing a key that was either ipsilateral or contralateral to the target's location. Irrelevant secondary stimuli were presented at the same location as the target, opposite the target, in both

locations, or not at all. An analysis of reaction times and error rates demonstrated sensory facilitation in both the visuo-tactile and audiovisual experiment, while evidence for motor enhancement was observed in the audiovisual experiment.

242. *Facial expression identification in mood disorders*
Bernice A. Fonseka, Stephanie Hassel, Glenda MacQueen, Mary Phillips, University of Calgary

The present study examined facial affect recognition in depressed and euthymic patients with bipolar disorder (BD) and depressed patients with unipolar depression (UPD) compared to healthy controls (HC). Compared to HC, depressed BD patients (BDD) made significantly more mistakes, had longer reaction times, and more frequently confused anger, fear, and disgust. Euthymic BD patients (BDE) mislabeled anger and disgust more often and also identified expressions as "happy" more frequently than other groups. Deficits in emotion recognition in BD regardless of mood-state demonstrate the need for continued assessment of these in a therapeutic as well as a psychosocial context.

243. *Impact of stress on hippocampus-mediated learning and memory in first-year students*
Abigail M. Steinberg, Nicholas J. B. Hargrove, Ronald W. Skelton, University of Victoria

Stress impairs declarative memory formation, hippocampal function and possibly spatial navigation. We used an anxiogenic version of a neuropsychological test, the PASAT, to induce mild acute stress and then tested first-year university students on a pictorial paired-associates task and navigation in spatial and non-spatial virtual Morris water mazes. The PASAT increased blood pressure slightly and impaired performance in the spatial (hippocampally mediated) maze, but did not affect performance in the non-spatial maze or in the pictorial paired-associates task. Although the stressor could have been more intense, these data indicate that even mild acute stress can interfere with spatial navigation.

244. *Assessment of the neural correlates of social cognition in bipolar disorder*
Jacqueline A. Bobyn, Stephanie Hassel, Glenda MacQueen, University of Calgary

Impairment in social cognition may contribute to alterations in interpersonal functioning that are characteristic of bipolar disorder (BD). The neural correlates of this still remain relatively unexplored. A social cognition task, addressing differences between social scenarios that either "threaten" one's self esteem, or "enhance" one's self esteem, was administered to BD patients (n=19) and healthy controls (HC) (n=25) in an MRI scanner. Preliminary data indicates differential patterns of prefrontal-cortical and limbic-subcortical activation in BD. Our findings will contribute to a better understanding of deficits in interpersonal social functioning in patients with BD and will be beneficial for treatment approaches.

245. *Lateralization of near-hand effects while judging graspability*
Carina La Mantia, Trent University

Evidence suggests that visual processing is influenced by placing a hand near the target. Do people process objects differently near the right versus the left hand? Participants classified 2D shapes varying in size as either graspable or not graspable while their left, right, or no hands rested near the target. Whereas having either hand nearby improved accuracy over the no-hand condition, participants responded more quickly in the right-hand condition than in the left- or no-hand condition. It is possible that the visual analysis of graspability, a predominantly left-hemisphere function, was facilitated by the recruitment of hand-related visual-tactile neurons linked to the right-hand/left-hemisphere.

Neuropsychology

246. *Towards ecological validity in assessing the genetic vulnerability of social cognitive impairments in schizophrenia*
Briana D. Cassetta, Vina M. Goghari, University of Calgary

Theory of mind (ToM) refers to the ability to attribute mental states to other individuals. Both people with schizophrenia and their unaffected family members have shown deficits on theory of mind tasks. However, written

tasks used in previous studies may not be representative of real-world encounters where tone, intonation cues, and facial expressions give valuable information. This study examined ToM skills in individuals with schizophrenia (n=28), their relatives (n=24), and controls (n=27) using video-taped social interactions. People with schizophrenia showed impairments on ToM compared to controls, whereas their relatives did not, suggesting disease specific effects on real-life social cognitive interactions.

247. *Recognition of anger facial expressions in depression*
Carina G. Chiu, Cameron M. Clark, Ruth L. Diaz, Vina M. Goghari, University of Calgary

This study examined angry face discrimination in depression. One hundred eighty-eight undergraduate students filled out questionnaires assessing depressive symptoms (BDI-II), personality, and mood. Participants were presented with angry and neutral faces (masked using random bubbles) and asked to discriminate the emotion presented. Participants scoring in the 10th percentile or below or in the 90th percentile or above on the BDI-II were psychometrically classified as the control and "depressed" groups, respectively. Significant differences were found in the regions of face significant for angry face discrimination between groups, suggesting differences in facial emotion processing in depression.

248. *Characterizing functional integrity: Intraindividual brain signal variability predicts post-operative memory loss in medial temporal lobe epilepsy (mTLE)?*
Kimberly Mikalson, University of Calgary; Mary P. McAndrews, University of Toronto; Andrea B. Protzner, University of Calgary

Intra-individual brain signal variability has been suggested to be a marker of functional capacity as it increases in development and decreases in advanced age. Here, we assessed whether pre-operative hippocampal signal variability, measured with fMRI in patients with mTLE, could predict memory decline after temporal lobectomy. Using partial least squares analysis, we found that variability in a network including the affected hippocampus, was related to memory change following surgery. Furthermore, this relationship was similar across several cognitive tasks measured during fMRI scanning. These findings provide a powerful validation of the concept that variability in brain signals reflects functional integrity.

249. *The influence of trait and state affect on phonemic fluency*
Sabrina Freund, Jenny Carstens, Chris Abeare, Olivia Chu, University of Windsor

The influence of trait and state affect on phonemic fluency was examined. Participants (N = 115) were randomly assigned into mood induction groups (positive, negative, neutral). There was a significant negative relationship between BDI-II scores and phonemic fluency. A 3X3 factorial ANOVA (BDI-II: high, medium, low X mood group: positive, negative, neutral) showed that low BDI-II/negative mood participants performed better than high BDI-II/positive mood and high BDI-II/neutral mood participants. These findings suggest that trait affect has a stronger influence on verbal fluency performance than fluctuating changes in mood.

Perception

250. *Plate shape and colour interact to influence taste and quality judgments*
Peter C. Stewart, Erica Goss, Memorial University of Newfoundland

Research has shown plate color to significantly influence taste perception with plate shape exerting little influence. However, the interaction between plate color and shape has received less attention. Participants (n=48) tasted identical samples of cheesecake presented on plates of different colours (i.e., black or white) and shapes (i.e., round or square) and provided ratings of sweetness, intensity, quality, and liking. Significant main effects and interactions (p

251. *Can a 15 minute online game replace Wechsler test of intelligence?*
Linette Lawlor-Savage, Vina M. Goghari, University of Calgary

The Wechsler Abbreviated Scale of Intelligence (WASI) is a standardized method of estimating intelligence. However, administration time is considerable (30-60 minutes) and administrators require extensive training to

ensure standardized administration and scoring. The present study compares WASI scores to a 15 minute computerized Brain Power Test (BPT) developed by Lumos Labs Inc. The BPT assesses five areas of intellectual ability: processing speed, attention, flexibility, problem solving, and memory. Correlations among WASI and BPT items are presented, and the validity of the BPT as an estimate of intelligence in research settings are discussed.

252. *Motorcycles are not invisible: A change-blindness study*
Bertrand Sager, Elisabeth Kreykenbohm, Daniel M. Bernstein, Farhad N. Dastur, David J. Froc, Kwantlen Polytechnic University

The most cited cause for motorcycle collisions involves a car turning left across a motorcyclist's path. The offending driver usually claims not to have seen the motorcyclist until too late. Past research focused on perceptual factors, like size and colour, to explain motorcycle inconspicuity. We used a change-blindness paradigm in which cars, motorcycles, pedestrians, or irrelevant objects disappear between flickers, hypothesizing that participants would fail to see motorcycles due to differences in size. However, data show that participants (N = 180) detected changes involving motorcycles at a significantly higher rate. We propose that high-level cognitive processes contribute to motorcycle collisions.

253. *Motorcyclists' lane-position as a factor in right-of-way violation collisions*
Bertrand Sager, Kwantlen Polytechnic University; Matthew R. Yanko, Simon Fraser University; Daniel M. Bernstein, Farhad N. Dastur, David J. Froc, Kwantlen Polytechnic University; Thomas M. Spalek, Simon Fraser University

A driver turning left and failing to notice an oncoming motorcyclist until it was too late is the most common cause of motorcycle collisions. Previous research has focused on motorcycle properties (size, shape, colour) to explain its inconspicuousness. Using a driving simulator we examined a different characteristic, namely the motorcycle's trajectory of approach. Our results show that drivers are more likely to turn in front of an oncoming motorcycle when it is in the left-side-of-the-lane position than when it is in the right-side-of-the-lane position. Based on these results we recommend that motorcyclists approach intersections from a right-side-of-the-lane position.

254. *Attention and the social conversation*
Christopher A. Healy, Nicholas Watier, Laurentian University

This study aimed to find a cue for the inattentiveness of a listener in a social conversation. Pupil size is related to cognitive effort, with dilated pupils associated with increased attentional load. Participants were shown images of faces with either large or small pupils, and were asked to judge the attention level of these faces. The results reveal that the attention level of faces with large pupils was rated significantly greater than faces with small pupils. 7.5% of participants recognized that the pupils were altered. Pupil size may be a covert cue for attention level in a social conversation.

255. *Effects of physical fatigue on distraction during visual search*
Tom Bullock, Barry Giesbrecht, University of California Santa Barbara

Acute bouts of exercise can influence a variety of cognitive processes. However, the effects of longer-term physical fatigue and task difficulty on perceptual distraction are unclear. In the present experiment, participants (n=7) engaged in submaximal (50% of VO2max) exercise for 2 hours. Control subjects (n=5) did not engage in exercise. Every 15 minutes, participants performed short blocks of a visual search response competition task under low and high perceptual load. Subjects in the exercise condition experienced significant distractor interference after two hours of exercise that was greater than twice the magnitude of interference prior to exercise.

256. *Native reading direction and assumptions of lighting sources*
Austen K. Smith, Izabela Szelest, Trista Neilly, Lorin J. Elias, University of Saskatchewan

An individual's first language has been shown to influence performance on cognitive tasks. Culturally diverse samples are rarely seen in experimentation and many models of brain organization and cognition are based on studies using only a left-to-right reading subpopulation. In an attempt to better explain the leftward lighting bias, eyetracking procedures were employed while 31 right-to-left and 57 left-to-right readers completed a visual search task that used perceived light sources to illuminate targets. Reaction time and scanning distribution group

differences/similarities as well as the need to include culturally diverse populations in experimentation are discussed.

257. *Investigating a potentially dangerous failure of real-world colour perception*
Javid Sadr, University of Lethbridge

There's no question that visual object perception is a very complex process, nor that it is a crucial and ubiquitous component of moment-to-moment behaviour in daily life. For certain classes of objects, however, robust successful discrimination may be a relatively simple matter of operating on a small number of easily quantified dimensions. Here we identify and study an extremely important and common class of real-world objects typically distinguished by relative size, simple geometric shape, and colour; moreover, we examine how their typical visual context may strongly disrupt normal colour perception, potentially leading to dangerous errors in misidentification.

258. *Distance and time estimation of video presented outdoor routes varying in complexity and encroachment*
Anthony N. Chaston, Kyle Gardiner, Mount Royal University

Participants watched four, 200m routes depicting walks through outdoor parks then estimated their time and distance. The routes varied in their complexity and encroachment. For half of the participants there was a GPS style mini-map in the lower right of the screen. Distance estimates showed a main effect of encroachment where high encroaching routes were estimated longer than low encroaching routes. Time estimates showed main effects for complexity and encroachment where higher complexity and encroachment both resulted in larger estimates. A follow-up study is briefly outlined, which uses eye tracking to investigate the use of the GPS mini-map.

Reasoning

259. *To switch or not to switch: Search strategies in experience-based judgments of proportion*
Pete Wegier, Julia Spaniol, Ryerson University

When searching two sources of information, one can search each comprehensively before switching, or search piece-wise by frequently switching between the two. Hills and Hertwig (2010) found that frequent switching led to underweighting of rare outcomes. In our study, participants were shown two virtual bags of coloured marbles and asked to determine which bag had a greater proportion of marbles of a target colour. We found no difference in judgment accuracy as a function of search strategies. Numeracy was negatively correlated with switching during search, such that highly numerate individuals showed a preference for comprehensive vs. piece-wise search patterns.

260. *Hindsight bias is unrelated to response time*
Ragav Kumar, Daniel M. Bernstein, Kwantlen Polytechnic University

Hindsight bias (HB) is the tendency to overestimate one’s ability to predict the known outcome of an event. Three experiments attempted to replicate Calvillo’s (2012) finding of a negative correlation between HB and reaction time. We conducted the first experiment on Amazon’s Mechanical Turk (N = 76), and used a memory design to measure HB. The second experiment was a direct replication of the first (N = 78). We conducted the third experiment on a university campus (N = 68), also with a memory design. In all three experiments, we observed no correlation between HB and reaction time.

261. *Reasoned connections: Evidence for a dual-process theory of creativity*
*Nathaniel Barr, Gordon Pennycook, Jennifer A. Stolz, Jonathan A. Fugelsang, University of Waterloo

We find support for a view in which analyticity potentiates creativity by showing that making creative connections between semantically distant concepts is related to cognitive ability and cognitive style. Specifically, success in tasks purported to require creative thought (i.e., Analogical Reasoning and the Remote Associates Task) was positively related to one’s willingness and ability to engage in analytic processing, indexed both by performance and self-report measures. More in-depth analyses reveal that a combination of reflective thinking style and high

cognitive ability was most useful for creative thinking. Our results are discussed within the context of dual-process theories of cognition.

262. *The numbers tell it all: Students are not into numbers*
Bob Uttl, Carmela A. White, Alain Morin, Mount Royal University

Colleges/universities focus on student learning and program outcomes. However, they are also strongly interested in student satisfaction. Previous research has demonstrated that Student Evaluation of Teaching (SET) ratings are strongly related to student prior course interest and that quantitative courses typically receive low SET ratings. We presented undergraduate students with descriptions of 44 psychology courses and asked them to rate how interested they were in taking each of them. The student interest in taking courses with high quantitative content was very low and their interest in taking courses with moderate quantitative content was somewhat higher but still very low.

263. *The lighter side of contempt: Comparing facial expressions of contempt and sarcasm*
Cheryl Techentin, Shaylah Swan, Megan Duffy, Mount Royal University

The present study examined the hypothesis that a sarcastic facial expression is a less negative form of contempt. Participants viewed 150 photographs depicting facial expressions of happy, sad, angry, contempt, sarcastic, and neutral and asked to identify which of the expressions they believed was being depicted and rate how well each expression represented the emotion. Results showed that although expressions were identified as clearly contempt and clearly sarcastic, there were a number of expressions that were identified/rated along a continuum between the two. Facial characteristics of each are compared using Ekman et al.'s (2002) facial action coding system.

264. *The role of local and global image statistics in numerosity estimation*
Anna Pham, Nicole D. Anderson, MacEwan University

This study evaluated whether numerosity estimates are affected by the local and global statistics of element placement. Numerosity estimates were evaluated using Glass patterns, structured noise patterns, and unstructured noise patterns using the method of single stimuli. Results demonstrated that numerosity estimates were significantly lower when the elements were arranged in dipoles (i.e., Glass patterns and structured noise patterns), than when elements were placed randomly throughout the display (unstructured noise patterns). These results suggest that numerosity estimates are affected by local, but not global, image statistics, consistent with the notion that numerosity judgements depend upon low-level neural activity.

265. *True Lies: Who can learn to tell?*
Emma C. Pote, Karly J. Dudar, Annie Roy-Charland, Melanie Perron, Laurentian University

Micro-expressions can leak concealed emotions during deception. Hidden emotions may be masked by another expression like a smile. Typically deception is detected at chance only. The present study trained students and police officers with the Micro-expression Training Tool. At pre and post test, a judgement of authenticity task was used. Eye-movements were measured during the judgement task. Training did not improve performance, but exposure to the judgement task did. Controls and trainees showed improvement in the judgement of true smiles but not masking smiles. Micro-expression detection and eye-movements varied as a function of emotion.

266. *Rewarding safe driving: An intervention for driver tailgating*
Robert C. Ramkhalawansingh, University of Toronto; Lana Trick, Blair Nonnecke, University of Guelph

Under normal driving conditions, motorists seldom receive safety-oriented feedback and this environment can foster dangerous behaviours such as tailgating. We hypothesized that positive feedback can remediate driver tailgating. Thus we created an in-vehicle display that (1) informs the driver of their following distance in real-time and (2) rewards them by acknowledging consistent, safe driving. Together these two gauges formed what we called our Headway Evaluation System. Drivers using the system maintained following distances that were conducive to collision avoidance and they expressed satisfaction in doing so. This system may be beneficial to both newly licensed and experienced motorists.

267. *The importance of multisensory feedback during driving in healthy older adults*
Robert C. Ramkhalawansingh, Jennifer Campos, University of Toronto

Driver training and assessment for older adults is imperative because losing the freedom to drive prematurely can be devastating and retaining a license while unfit to drive can be lethal. Driving simulators are an excellent tool for safely evaluating performance under challenging conditions. However, older adults are prone to simulator sickness because simulators are typically devoid of accurate sound, vibration, and motion feedback. Our goal is to systematically pair visual feedback with sound, vibration, and motion in our state-of-the-art simulator to determine how each type of feedback influences driving performance and simulator sickness. Preliminary findings are discussed.

268. *Impact of instructions in the judgment of authenticity of smiles*
Sean Thomas, Justin Chamberland, Amanda P. Labbe, Annie Roy-Charland, Melanie Perron, Laurentian University

Manipulation of instructional verbs results in significantly slower response times for instruction verbs requiring deeper processing (distinguish) compared to ones that require lower depth of processing (view). Research involving the judgment of authenticity of smiles employs varying instructions (really/truly happy vs. not really/truly happy). However, the effects of using these different words interchangeably has not been empirically tested. The present research examined possible effects of manipulating instructions with regards to the judgment of authenticity of smiles. Results revealed no significant effect of the use of truly and really happy regardless of differences in definitions for these words.

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Notes

Brief Guide to Off-Campus Dining, Entertainment, and Essentials

Walkable from Campus

- Jamesons Irish Pub (http://jamesonspubs.com/brentwood/) - Irish pub fare
  Brentwood Shopping Centre 3790 Brentwood Road NW - 403.220.9888
- The Kilkenny Irish Pub (http://www.calgarysbestpubs.com/pubs/kilkenny) - Irish pub fare
  Brentwood Shopping Centre #500-3630 Brentwood Rd NW - 403.284.4404
- Redwater Grille (http://www.redwatergrille.com/stadium) - Fresh regional rustic fare
  1935 Uxbridge Drive NW - 403.220.0222
- Safeway – Brentwood Shopping Centre - 3636 Brentwood Road NW
- London Drugs - Brentwood Shopping Centre - 3630 Brentwood Road NW
- Shoppers Drug Mart – Stadium Shopping Centre - 23-1941 Uxbridge Dr NW
- Liquor Depot – Brentwood Shopping Centre - Suite 750-3630 Brentwood Rd NW – Great selection
- Liquor Box – Across from McMahon Stadium - 2112 Crowchild Trail NW - Closer

Downtown (Accessible via CTrain or Taxi)

- Aida's Mediterranean Bistro (http://www.aidasbistro.ca) - Lebanese fare
  2208 4th Street SW - 403.541.1189
- Craft Beer Market (http://calgary.craftbeermarket.ca) - Excellent beer selection, upscale pub food
  345 10th Avenue SW - 403.514.2337
- District Urban Tavern (http://calgarytavern.com) - Gastropub, microbrewery
  607 11th Avenue SW - 403.233.2433
- The Palomino Smokehouse (http://www.thepalomino.ca) - BBQ smokehouse, a Calgary staple
  109-7th Avenue SW – 403.532.1911
- The Coup (http://www.thecoup.ca) - Modern vegetarian fare
  924 17 Ave SW – 403.541.1041

Kensington (Accessible via CTrain)

- Broken Plate (http://www.brokenplate.ca) - Greek fare
  302 10 St NW - 403.283.6300
- Delicious Thai (http://www.delicious-thai.com) - Thai fare
  314 10 St NW - 403.450.1996
- Pulcinella (http://pulcinella.ca) - Wood-fired Napoletana pizza
  1147 Kensington Crescent NW - 403.283.1166
- Tandoori Hut (http://www.tandoorihutcalgary.com) - Indian fare
  217 10 St NW – 403.270.4012

Some Calgary Nightlife

- Amsterdam Rhino (http://amsterdamrhino.com) - Restaurant and nightclub
  607 – 11th Avenue SW - 403.233.0058
- Aussie Rules (http://www.aussierules.ca) - Dueling piano bar
  1002 37 St SW - 403.249.7933
- Drum and Monkey (http://www.drumandmonkey.ca) - Nightclub and bar
  1201 1 Street SW - 403.261.6674
- Loose Moose Theatre (http://www.loosemoose.com) - Friday and Saturday night improv
  1235 26th Ave SE - 403.265.5682
- West Nightclub (http://www.westrestaurantandbar.com) - Nightclub and bar
  225 7th Avenue SW - 403.237.5556
- Wurst (http://wurst.ca)
  2437 4th Street SW - 403-245-2345 – Restaurant and Beerhall

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Glen Bodner

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Chris Sears
Aiden Arnold
Mark Huff
Ted Slone
Michael Spilka
Cody Tousignant
Ena Vukatana
Lenka Zdrazilova

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Angela Danko
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Frances Churcher
Bernice Fonseka
Julie Jenkins
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Conference Event Organizing
University of Calgary Conference Services

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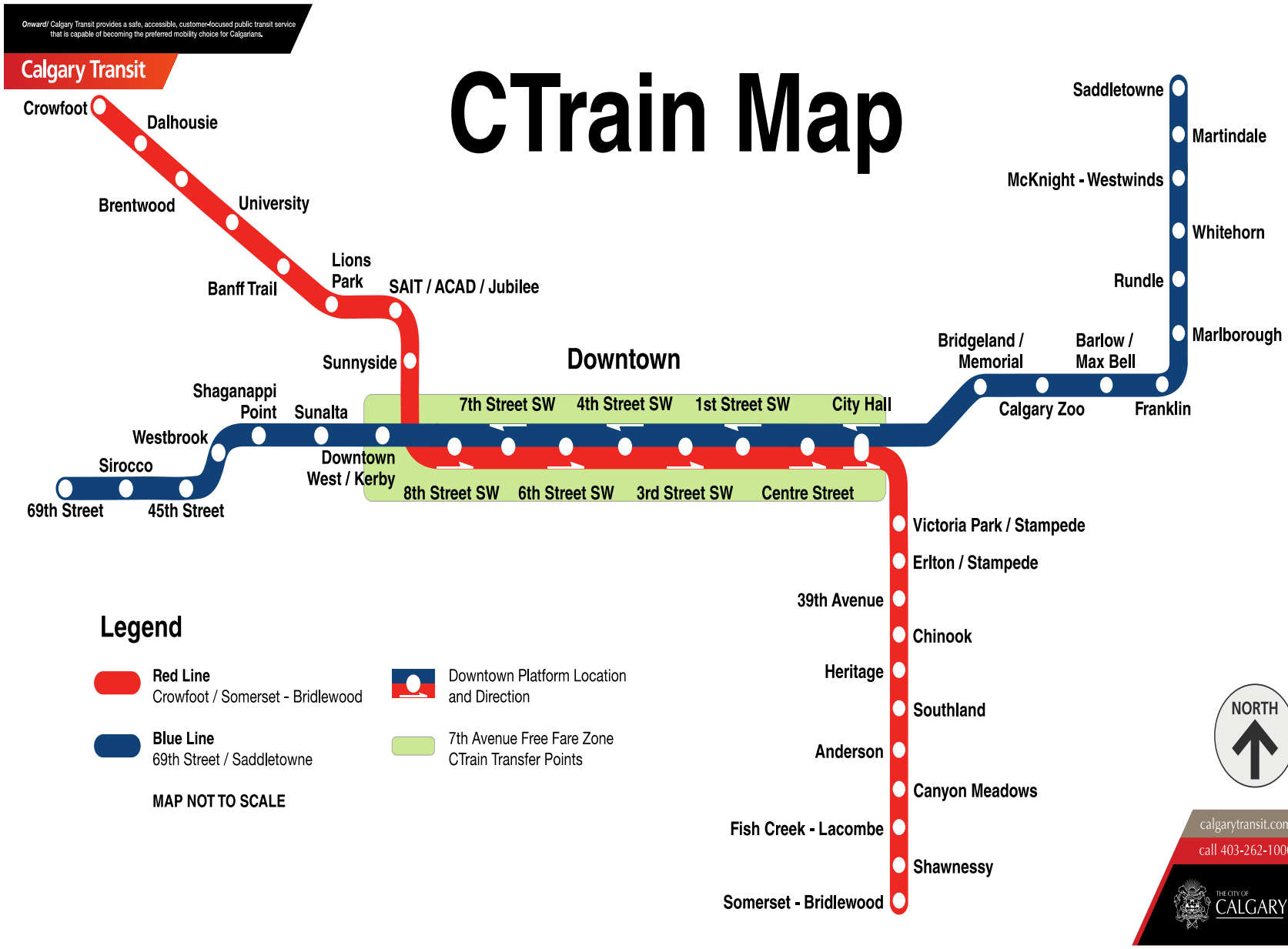
Chris Oriet (Member at Large)

Future Meetings

Ryerson University, Toronto
June 12-14, 2014
Organizer: Ben Dyson (joint with EPS)

Carleton/Ottawa, Ottawa
June 6-8, 2015
Organizer: Guy Lacroix (coordinated with CPA)

Carleton/Ottawa, Ottawa
June TBA, 2016
Organizer: Charles A. Collin


Onward! Calgary Transit provides a safe, accessible, customer-focused public transit service that is capable of becoming the preferred mobility choice for Calgarians.
Calgary Transit
CTrain Map
Crowfoot
Dalhousie
Brentwood
University
Banff Trail
Lions Park
SAIT / ACAD / Jubilee
Sunnyside
Downtown
7th Street SW
4th Street SW
1st Street SW
City Hall
8th Street SW
6th Street SW
3rd Street SW
Centre Street
Shaganappi Point
Sunalta
Westbrook
Sirocco
Downtown West / Kerby
69th Street
45th Street
Saddletowne
Martindale
McKnight - Westwinds
Whitehorn
Rundle
Marlborough
Bridgeland / Memorial
Barlow / Max Bell
Calgary Zoo
Franklin
Victoria Park / Stampede
Erlton / Stampede
39th Avenue
Chinook
Heritage
Southland
Anderson
Canyon Meadows
Fish Creek - Lacombe
Shawnessy
Somerset - Bridlewood
Legend
Red Line
Crowfoot / Somerset - Bridlewood
Blue Line
69th Street / Saddletowne
MAP NOT TO SCALE
Downtown Platform Location and Direction
7th Avenue Free Fare Zone
CTrain Transfer Points
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