



Timothy R. Koscik

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@TimKoscik

Education

University of Toronto (2011 – Present) – Postdoctoral Fellow

Advisors: Adam K. Anderson, PhD & William A. Cunningham, PhD

University of Iowa (2011) – Postdoctoral Fellow

Advisor: Daniel Tranel, PhD

University of Iowa (2006 – 2010) **PhD** – Neuroscience

Dissertation: “Social Inference and the Evolution of the Human Brain”

Advisor: Daniel Tranel, PhD

University of Toronto (2001 – 2005) **(Hons.) BSc** – Psychology Specialist

Research Interests

My research is focused on the role of sensory processing in social cognition and decision-making. I am particularly interested in regions of vmPFC and OFC that descend from mammalian chemosensory regions. Chemosignalling is an integral and necessary feature of the social lives of most mammal species; it is very curious that humans lack such social chemosignalling despite complex sociality. I have presented a novel, theoretical background, the Inferential Brain Hypothesis, where conspecific evaluation shifted from a perceptual process, highly tied to chemosensation, to an inferential process decoupled from a single sensory modality, which placed a premium on processing power and drove the expansion of the human brain. Currently I am exploring some of the implications of this theoretical framework in terms of functional organization of the human brain as well as social cognitive processing and interpersonal judgments.

Research Experience

Postdoctoral Fellow (Aug. 2011 – Present)

Department of Psychology, University of Toronto

Supervisors: Adam Anderson, PhD & William A. Cunningham, PhD

Postdoctoral Fellow (Jan. 2011 – Jul. 2011)

Division of Behavioral Neurology and Cognitive Neuroscience, Department of Neurology,
University of Iowa Hospitals and Clinics.

Supervisor: Daniel Tranel, PhD

Graduate Research Assistant (Aug. 2006 – Dec. 2010)

Division of Behavioral Neurology and Cognitive Neuroscience, Department of Neurology,
University of Iowa Hospitals and Clinics.

Supervisor: Daniel Tranel, PhD

Research Assistant (May 2004 – Mar. 2005)

Kunin-Lunenfeld Applied Research Unit, Baycrest Centre for Geriatric Care, University of
Toronto.

Supervisor: Deirdre Dawson, PhD

Research Assistant (Oct. 2002 – May 2004)

Department of Psychology, University of Toronto.

Supervisor: Penelope Lockwood, PhD

Awards

CIHR Postdoctoral Fellowship (2013-Current)
NSERC-CSNRG Postgraduate Scholarship (2008-2010)
First Year Graduate Research Award (2007)
Jakobsen Graduate Research Conference - Honorable Mention (2007)
Dean's List (2001-2005)
National Biology Scholarship (2001)
Aiming for the Top Tuition Scholarship (2001-2004)
T. Mossman Scholarship in Mathematics (2001)

Publications

1. **Koscik TR**, White N, Chapman H, & Anderson AK. (2014). "Sensory Foundations of Social and Emotional Processing." In MS Gazzaniga & GR Mangun (Eds.) *The Cognitive Neurosciences*, 5th Edition, 751-766. Cambridge, Mass.: The MIT Press.
2. **Koscik TR** & Tranel D. (2013). Abnormal causal attribution leads to advantageous economic decision-making: A neuropsychological perspective. *Journal of Cognitive Neuroscience*, 25 (8), 1372-1382. PMID: 23574584
3. van der Plas E, **Koscik TR**, Conrad A, Moser D, & Nopoulos P. (2013). Social motivation in individuals with isolated cleft lip and palate. *Journal of Clinical and Experimental Neuropsychology*, 35 (5), 489-500. PMID: 23634967
4. **Koscik TR** & Tranel D. (2012). The human ventromedial prefrontal cortex is critical for transitive inference. *Journal of Cognitive Neuroscience*, 24(5), 1191-1204. PMID: 22288395
5. **Koscik TR** & Tranel D. (2012). Brain evolution and human neuropsychology: The Inferential Brain Hypothesis. *Journal of the International Neuropsychological Society*, 18(3), 394-401. PMID: 22459075
6. Salinas J, Mills ED, Conrad AL, **Koscik TR**, Andreasen NC, & Nopoulos P. (2012). Sex differences in parietal lobe structure and development. *Brain and Cognition*, 9(1), 44-55. PMID: 22333522
7. **Koscik TR** & Tranel D. (2011). The human amygdala is necessary for developing and expressing interpersonal trust. *Neuropsychologia*, 49 (4), 602-611. PMID: 20920512
8. Gupta R, **Koscik TR**, Bechara A, & Tranel D. (2011). The amygdala and complex decision-making. *Neuropsychologia*, 49 (4), 760-766. PMID: 20920513
9. **Koscik TR**, Bechara A, & Tranel D. (2010). Sex-related functional asymmetry in the limbic brain. *Neuropsychopharmacology, Special Issue: Neurocircuitry: A Window into the Network Underlying Neuropsychiatric Disease*, 35 (1), 340-341. PMID: 20010707
10. **Koscik TR**, O'Leary D, Moser D, Andreasen NC, & Nopoulos P. (2009). Sex differences in parietal lobe morphology: Relationship to mental rotation performance. *Brain and Cognition*, 69(3), 451-459. PMID: 18980790
11. Magnotta VA, Kim J, **Koscik TR**, Beglinger LJ, Espinso D, Langbehn D, Nopoulos P, Paulsen JS. (2009). Diffusion tensor imaging in preclinical Huntington's disease. *Brain Imaging and Behavior*, 3(1), 77-84. PMID: 21415933

Manuscripts in Progress

1. Belfi A, **Koscik TR**, & Tranel D. (under review *Neuropsychologia*). Damage to the insula is associated with abnormal interpersonal trust.

2. Sutterer M, **Koscik TR**, Kovach C, & Tranel D. (under review *Cortex*). Sex-related functional asymmetry of the amygdala in risky and ambiguous uncertainty.
3. Shi H, Niu Y, **Koscik TR**, Yao S, & Anderson AK. (awaiting revision *Vision Research*). Cooperating and competing effects of physical salience and reward value on saccadic eye movements.
4. **Koscik TR**, Chowdhury A, Azad F, Tranel, D, & Anderson, AK. (in preparation). Hierarchical position affects the use of transitive inference in a social setting.
5. **Koscik TR**, Azad F, Chowdhury A, Anderson AK, & Tranel D. (in preparation). Damage to the ventromedial prefrontal cortex results in abnormal inference of social hierarchy.
6. Moreno G, **Koscik TR**, Tranel D, & Denburg N. (in preparation). Age-related changes in decision-making under uncertainty and expected value.
7. Scherer AM, Taber-Thomas B, Robinson H, Edminston P, **Koscik TR**, & Tranel D. (unpublished, status unknown). Seeking what we want: A neuropsychological examination of competing motivational theories of confirmatory information seeking.

Works in Progress (Collaborators)

1. "How do I smell? An investigation of how people classify smells at the Ontario Science Centre"
(Abramsons M, Cai W, Chen C, Chowdhury A, Haleem F, Nikovski E, Patel H, Prabakaran N Rokos A, Tso K, & Cunningham W, Anderson AK)
2. "An affordable MR-compatible, 10-channel olfactometer with warmed, humidified air."
(Jones-Rounds J, Markello R, Szoka EC, & Anderson AK)
3. "Multimodal object representations in olfactory sensory regions of human OFC."
(Markello R, Cunningham WA, & Anderson AK)
4. "Sniffing interferes with processing of social objects not just social evaluations." & "Are some people 'social sniffers'?"
(Azad F, Chowdhury A, Li T, Roble M, Zhang M, & Anderson AK)
5. "Infrared imaging of facial expressions and sniffing in humans."
(Chowdhury A, Azad F, Muntaha S, Prabakaran N, Zhang M, & Rule N, Cunningham WA, Anderson AK)
6. "Interpersonal effects on interpersonal and peripersonal space."
(Cai W, & Anderson AK, Cunningham WA)
7. "Biases in kinship judgement modulated by group membership and size."
(Prabakaran, N, Abramsons M, Chen C, Haleem F, Nikovski E, & Anderson AK, Cunningham WA)
8. "ERP and kinship perception and judgement."
(Prabakaran N, Man V, & Cunningham W)
9. "Cross-domain generalizability of improvements to olfactory performance: Effects on executive function, social judgment, and memory."
(Muntaha S, Patel, H, Rokos, A, Tso, K, Muntaha, S, & Anderson, AK)
10. "Primate brains are not optimized for juvenile period social learning, meta-analysis."
(Zhang M, & Anderson AK)
11. "Widespread olfactory deficits in human disease: Meta-analysis and review."
(Tso, K, & Anderson, AK)

Recent Presentations

1. **Koscik TR**, & Anderson AK. (2013). Olfaction, sniffing, and social cognition: New evidence for shared neural substrates and processes. *Poster. SFN Annual Meeting 2013*.
2. **Koscik TR**, & Tranel D. (2010). Abnormal social attributions following damage to the ventromedial prefrontal cortex. *Poster. SFN Annual Meeting 2010*.



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3. Chen KH, **Koscik TR**, & Tranel D. (2010). Economic decision-making is altered following damage to anterior but not posterior insular cortex: Evidence from the ultimatum game. *Poster. SFN Annual Meeting 2010.*
4. **Koscik TR** & Tranel D. (2009). Ventromedial prefrontal cortex damage and the fundamental attribution error. *Poster. SFN Annual Meeting 2009.*
5. Tranel D & **Koscik TR**. (2009). Myopia for the future and interpersonal trust following focal brain injury. *Poster. SFN Annual Meeting 2009.*
6. **Koscik TR** & Tranel D. (2009). Effects of focal brain damage on sexual behavior. *Poster. CNS Annual Meeting 2009.*
7. **Koscik TR** & Tranel D. (2008). Neural correlates of emotion and social conduct. *Workshop Presentation, HBM Annual Meeting 2008.*
8. **Koscik TR** & Tranel D. (2008). The effects of unilateral brain injury on decision-making are modulated by sex and cerebral hemisphere: Risky vs. ambiguous uncertainty, trust and reciprocity. *Poster. SFN Annual Meeting 2008.*
9. **Koscik TR** & Nopoulos, P. (2007). Sex differences in parietal lobe morphology: Relationship to mental rotation performance. *Oral Presentation. SFN Annual Meeting 2007.*

Collaborations

Adam K. Anderson, Associate Professor at Cornell University

developing an MR-compatible olfactometer and working on fMRI studies at intersecting olfaction and social cognition.

Amy Belfi, Graduate Student at the University of Iowa

Interpersonal trust following focal lesions to the insula.

Matthew Sutterer, Graduate Student at the University of Iowa

Sex-related functional asymmetry of the vmPFC in relation to risky and ambiguous decision making.

Natlaie Denburg, Assistant Professor at the University of Iowa, and Georgina Moreno, Graduate Student at the University of Iowa

Age-related changes in risk and ambiguity aversion.

Technical Skills

Programming: Matlab/Octave, Arduino, High Performance Computing (at SciNet, in progress), GNU Parallel (in progress), Python (in progress)

Statistics: SPSS, R (in progress)

Psychophysiology measurement and analysis: SCR, respirometry, ECG; Biopac/Acknowledge; FLIR-InfraRed (facial, respiratory imaging); Infrared Analysis Toolbox (under development, Matlab/Octave-based); Eye-Link eye-tracking

Olfactometry: Design and construction of MR-compatible olfactometry equipment

Human brain lesion methodology, including lesion mapping: BrainVOX/MAP3, MRICroN, MapMaker Toolbox (under development, Matlab/Octave-based)

fMRI analysis (in progress): FSL, AFNI, SPM, Multi-voxel pattern analysis fMRI

Teaching

Mentoring (current) – Undergraduate students completing independent research projects:

A. Chowdhury – “Infra-red imaging of facial expressions of basic emotions and sensory acquisition”



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D. Cai – “Interpersonal effects on interpersonal and peripersonal space”

N. Prabakaran – “Biases in kinship judgement modulated by group membership and size”

K. Tso, A. Rokos, H. Patel – “Olfactory training generalization to executive function, memory, and social function.”

C. Chen, E. Nikovski, F. Haleem, M. Abramsons – “How do I smell? An investigation of how people classify smells.”

Mentoring (past) – Undergraduate students completed independent research projects:

F. Azad – “Social transitive inference in humans: Effects of vmPFC lesions and hierarchical position”

M. Zhang – “Primate life history evolution in relation to lifestyle, cognition, and brain structure” & “Olfactory attention and attentional blindness to changes in ambient odours”

S. Muntaha – “Transient, acquired chemosignalling in humans”

Mentoring (all-time) Research assistants – 30 undergraduate students

Course Development (current) Matlab/Octave for Cognitive Neuroscience course

Teaching Assistant (2008) Medical Neuroscience

Teaching Assistant and Coordinator (2007) Applied statistics for cognitive neuroscience

Committees

Ulowa Neuroscience Graduate Admissions Committee (2010)

Ulowa Brain Awareness Committee (2006-2009)

Journal Reviews

Brain and Cognition (2), Cortex (2), Journal of Clinical and Experimental Neuropsychology (1), Learning and Individual Differences (1), Nature Neuroscience (1), Neurology (1), Neuropsychologia (8), Neuropsychology (4), Neuroscience and Biobehavioral Reviews (1), Proceedings of the Royal Society B (1), Psychiatry Research: Neuroimaging (1), Psychological Science (2), Social Cognitive and Affective Neuroscience (3)

Professional Affiliations

Society for Neuroscience, Cognitive Neuroscience Society, American Association for the Advancement of Science.