COLLEEN HUGHES
502-1121 Rue Mistral, Montreal, Quebec H2P 2X7
colleen.hughes@mail.mcgill.ca – www.colleen-hughes.com

EDUCATION

2020 Ph.D., Psychological and Brain Sciences Department, Indiana University (*IU*)
2013 B.A., Psychology, St. Mary's College of Maryland (*SMCM*), *Magna Cum Laude*

RESEARCH POSITIONS

12/2020- **Postdoctoral Researcher**
Laboratory of Brain and Cognition directed by Dr. Nathan Spreng
Montreal Neurological Institute-Hospital
McGill University

7/2020-12/2020 **Postdoctoral Researcher**
Jointly supervised by Drs. Natalie Ebner & Nathan Spreng
Department of Psychology
University of Florida

8/2016-7/2017 **Research Assistant**
Imaging Research Facility
Psychological and Brain Sciences Department
Indiana University

7/2014-7/2015 **Lab Manager**
Social Action Lab directed by Dr. Dolores Albarracin
Psychology Department
University of Illinois at Urbana-Champaign

RESEARCH SUPPORT

8/2017-7/2019 *Training in clinical translational science: Maximizing the public health impact*
Ruth L. Kirschstein NRSA Institutional Research Training Grant
National Institute of Mental Health T32 MH103213
Role: Predoctoral Trainee

PUBLICATIONS (⁺JOINT FIRST AUTHORSHIP; *MENTORED UNDERGRADUATE)

1. Cassidy, B. S., ⁺**Hughes, C.**, Krendl, A. C. (2021). Age differences in neural activity related to mentalizing during person perception. *Aging, Neuropsychology, and Cognition*, *28*(1), 143-160. https://doi.org/10.1080/13825585.2020.1718060.
2. Cassidy, B.S., ⁺**Hughes, C.**, Krendl, A.C. (2020). A stronger relationship between reward responsivity and trustworthiness evaluations emerges in healthy aging. *Aging, Neuropsychology, and Cognition*, 1-18. https://doi.org/10.1080/13825585.2020.1809630.
3. **Hughes, C.**, Fujita, K., Krendl, A.C. (2020). Psychological distance reduces the effect of internalized stigma on mental health treatment decisions. *Journal of Applied Social Psychology*, *50*(8), 489-498. https://doi.org/10.1111/jasp.12676.

4. **Hughes, C**., Faskowitz, J., Cassidy, B.S., Sporns, O., Krendl, A.C. (2020). Aging relates to a disproportionately weaker functional architecture of brain networks during rest and task states. *NeuroImage, 209,* 116521. https://doi.org/10.1016/j.neuroimage.2020.116521.
5. Cassidy, B.S., **Hughes, C.**, *Lanie, S., Krendl, A.C. (2019). Effects of executive ability on bias and ingroup perceptions in aging. *Psychology and Aging, 35*(2), 283-294. https://psycnet.apa.org/doi/10.1037/pag0000420.
6. **Hughes, C.**, Babbitt, L., Krendl, A.C. (2019). Culture impacts the neural response to perceiving outgroups among black and white faces. *Frontiers in Human Neuroscience, 13,* 143. https://doi.org/10.3389/fnhum.2019.00143.
7. **Hughes, C.**, [+]Cassidy, B. S., Faskowitz, J., Avena-Koenigsberger, A., Sporns, O., Krendl, A. C. (2019). Age differences in specific neural connections within the default mode network underlie theory of mind. *NeuroImage, 191*, 269-277. https://doi.org/10.1016/j.neuroimage.2019.02.024.
8. McDonald, J., McDonald, P., **Hughes, C.**, Albarracin, D. (2017). Recalling and intending to enact health recommendations: Optimal number of prescribed behaviors in multibehavior messages. *Clinical Psychological Science, 5*(5), 858-865. https://doi.org/10.1177%2F2167702617704453.

MANUSCRIPTS UNDER REVIEW ([+]JOINT FIRST AUTHORSHIP)

1. Lohmann, S., Mekawi, Y., **Hughes, C.,** Sunderrajan, A., Tengshe, C., Balasubramaniyan, A., Albarracin, D. (under review). It is a storm indeed: A meta-analysis of executive control and repetitive negative thinking in depression and anxiety.
2. Cassidy, B. S., [+]**Hughes, C.**, Krendl, A. C. (under review). Arbitrary category labels modulate impressions of faces.

AWARDS AND HONORS

2021	2021 Summer Program in Aging, *Canadian Institutes of Health Research Institute of Aging*
2020	Gordon Kato Summer Research Award, *Social Psychology Faculty at IU*
2016, 2017 2019	Provost's Travel Award for Women in Science, *IU*
2016	Graduate Student Travel Award, *Society for Personality and Social Psychology*
2016	Honorable Mention, *National Science Foundation Graduate Research Fellowship Program*
2014	*SMCM* Foundation Travel Award
2014	Top Performer, Senior Exam in Methods and Statistics, *SMCM*
2014	Faculty-Student Research Award, *Council on Undergraduate Research & Association for Psychological Science*
2014	Paul H. Nitze Scholars Program Graduation Commendation Honors, *SMCM*
2014	Psychology Major Award, *SMCM*
2012, 2013	Paul H. Nitze Scholars Program Research and Travel Funding, *SMCM*
2012	St. Mary's Undergraduate Summer Research Fellowship, *SMCM*

2013	Lisa Zsebedics Memorial Award in Psychology, *SMCM*
2010-2013	Dean's List (all semesters), *SMCM*

INVITED TALKS

2020, February	Neuro Cognition and Circuits Seminar Series, Montreal Neurological Institute, Montreal, QC
2019, December	Aging & Development Program Seminar, Washington University, St. Louis, MO
2019, October	Center for Cognitive and Behavioral Brain Imaging MRI Users Workshop, The Ohio State University, Columbus, OH

CONFERENCE TALKS

1. **Hughes, C.**, Cassidy, B. S., Faskowitz, J., Avena-Koenigsberger, A., Sporns, O., Krendl, A. C. (2019, October). *Age differences in specific neural connections within the Default Mode Network underlie theory of mind*. Indiana Neuroimaging Symposium Data Blitz, Indianapolis, IN.
2. **Hughes, C.,** Fujita, K., Krendl, A.C. (2019, April). *When does stigma interfere with mental health treatment-seeking?* Midwestern Psychological Association conference, Chicago, IL.
3. **Hughes, C**., Klaasen, K., Dameron, S., & Lappia, J. (2013, November). *Branding small honors programs in the USA and the Netherlands to overcome the image gap between honors and non-honors students and faculty*. National Collegiate Honors Council Annual Conference, New Orleans, LA.
4. **Hughes, C.,** Klaasen, K., & Lappia, J. (2013, October). *The image gap between honors and non-honors students and faculty*. Rotterdam University Honors Conference 2013, Rotterdam, The Netherlands.
5. **Hughes, C.**, & Maseda, T. (2012, November). *Balancing identity with community at small colleges: How small honors programs strive to fit in with their communities while retaining an identity*. National Collegiate Honors Council Annual Conference, Boston, MA.

POSTER PRESENTATIONS (*MENTORED UNDERGRADUATE)

1. **Hughes, C.**, Cassidy, B. S., Faskowitz, J., Avena-Koenigsberger, A., Sporns, O., Krendl, A. C. (2020, February). *Age differences in specific neural connections underlie theory of mind*. Society for Personality and Social Psychology annual convention, New Orleans, LA.
2. **Hughes, C.**, Babbitt, L., Krendl, A. C. (2019, May). *Culture impacts the neural response to perceiving outgroups among Black and White faces*. Social and Affective Neuroscience Society conference, Miami, FL.
3. **Hughes, C.,** Krendl, A.C. (2019, February). *Interactions among dissociable executive functions predict reduced implicit racial stereotyping.* Society for Personality and Social Psychology annual convention, Portland, OR.
4. **Hughes, C.**, Cassidy, B. S., Faskowitz, J., Avena-Koenigsberger, A., Sporns, O., Krendl, A. C. (2018, May). *Modularity of intrinsic functional brain networks predicts age-related*

changes in social cognition. Social and Affective Neuroscience Society conference, Brooklyn, NY.

5. *Brown, R., **Hughes, C.**, Cassidy, B. S., Krendl, A. C. (2018, April). *How do age and declines in executive ability affect the neural responses to race perception?: An fMRI investigation.* Midwestern Psychological Association conference, Chicago, IL.
6. *Lu, L., **Hughes, C.**, Krendl, A. C. (2018, April). *Sounding out groups: The interaction between accents, appearance, and racial stereotypes.* Midwestern Psychological Association conference, Chicago, IL.
7. **Hughes, C.,** Fujita, K., Krendl, A.C. (2018, March). Internalized stigma interferes with mental health treatment-seeking intentions at near psychological distance. Society for Personality and Social Psychology annual convention, Atlanta, GA.
8. Sunderrajan, A., Lohmann, S., Mekawi, Y., **Hughes, C.**, Tengshe, C., Balysubramaniyan, A., & Albarracin, D. (2017, April). *Executive control, repetitive negative thinking, and depression and anxiety: A meta-analysis.* Midwestern Psychological Association conference, Chicago, IL.
9. **Hughes, C.**, Krendl., A.C. (2017, January). *Controllability of depression predicts mental health treatment beliefs*. Society for Personality and Social Psychology annual convention, San Antonio, TX.
10. **Hughes, C.**, Krendl., A.C. (2016, October). *Do etiological explanations of depression impact mental health treatment beliefs?* Psychological and Brain Sciences Department Graduate Research Poster Session, Bloomington, IN.
11. Sunderrajan, A., Lohmann, S., Mekawi, Y., **Hughes, C.**, Tengshe, C., Balysubramaniyan, A., & Albarracin, D. (2016, January). *Self-control, perseverating thinking, and internalizing psychopathology: A meta-analytic review.* Society for Personality and Social Psychology annual convention, San Diego, CA.
12. **Hughes, C.**, McDonald, P., & Albarracin, D. (2015, May). *Recall of behavioral health recommendations: Optimal number of prescribed behaviors for behavior change.* Midwestern Psychological Association conference, Chicago, IL.
13. **Hughes, C.** & Han, H.A. (2014, May). *Manipulating motivational states causes explicit discriminations between wanting and liking.* 26th Annual Association for Psychological Science (APS) Convention in San Francisco, California.
14. **Hughes, C.** & Han, H.A. (2012, July). *Do what I say, not what I do: Exploring the impact of explicit and implicit attitudes discrepancies on attitude measurement*. St. Mary's Undergraduate Research Fellowship Symposium, St. Mary's City, MD.
15. **Hughes, C.**, Roth, J., & O'Donnell, D. (2012, March). *School climate, future expectations, and mental health among high school students in the Gambia, West Africa*. 72nd Annual Society for Applied Anthropology Meeting in Baltimore, MD.

TEACHING

Instructor of Record (Indiana University)

Methods of Experimental Psychology Laboratory Spring 2018

Teaching Assistant (Indiana University, *unless noted*)

Abnormal Psychology	Spring 2020
Laboratory in Social Psychology	Fall 2015, Fall 2019
Introduction to Psychology I & II	Summer 2016
Social Psychology & Individual Differences	Spring 2016
Sensory & Physiology (*SMCM*)	Fall 2012
Psychological Statistics (*SMCM*)	Fall 2011, Fall 2012

MENTORSHIP

Undergraduate independent research projects:

Lauren Lu (Indiana University, 2018-2019): *Sounding out groups: The interaction between accents, appearance, and racial stereotypes*

Caitlin Lane (Indiana University, 2018-2019): *Contributions of age and executive ability to implicit racial stereotyping*

Rachel Brown (Indiana University, 2017-2018): *How do age and declines in executive ability affect the neural responses to race perception: an fMRI investigation*

Undergraduate research assistants:

Indiana University (19 students): Jenny Zhao (2019-2020), Holly Youngberg (2018-2020), Cierra Williams (2017-2018), Jaclyn Lisnek (2016-2018), Lauren Lu (2015-2019), Rachel Brown (2015-2018), Jessica Fox (2016-2018), Caitlin Lane (2016-2019), Lindsey Fisher (2016-2017), Stephanie Miljkovic (2016-2017), Niji Shah (2016-2017), Katherine Haggerty (2016-2017), Sarah Kalishman (2016), Luis Dominguez (2016), Gregory Sprout (2015-2016), Shelby Lanie (2015-2016), Andrew Stark (2015-2016), Beverly Falodun (2015), Rayne Kim (2015-2016)

University of Illinois at Urbana-Champaign (*4 students;* 2014-2015): Xiomeng Li, Jackie Genova, Chengyu Fang, Ashana Badlani

High school interns:

Ellie Zimmerman (University of Illinois at Urbana-Champaign, 2015-2016)

PROFESSIONAL SERVICE

Ad hoc reviewing (journals):

NeuroImage	*Human Brain Mapping*
Neuroscience	*Cognition*

Ad hoc reviewing (organizational):

2020	Conference Abstract Reviewer, *Organization for Human Brain Mapping*
2015-2020	Student Poster Award Reviewer, *Society for Personality and Social Psychology*
2015-2020	Outstanding Research Award Reviewer, *Society for Personality and Social Psychology*
2014-2016	Student Research Award Reviewer, *Association for Psychological Science*
2014-2016	Student Grant Competition Reviewer, *Association for Psychological Science*

Department service:

2019-2020	Social psychology area seminar co-organizer, *IU Psychological and Brain Sciences Department*
2019	Women in science panel co-organizer, *IU Psychological and Brain Sciences Department*
2018-2019	Social psychology area journal club organizer, *IU Psychological and Brain Sciences Department*
2016-2019	Panel member and volunteer, Getting You into Indiana University Graduate Recruitment Program
2016	ScienceFest community outreach program co-organizer, *IU Psychological and Brain Sciences Department*

PROFESSIONAL MEMBERSHIPS

Society for Personality and Social Psychology
Social and Affective Neuroscience Society
Organization for Human Brain Mapping

Institut-Hôpital neurologique de Montréal
Montreal Neurological Institute-Hospital

R. Nathan Spreng, PhD
Associate Professor, Department of Neurology and Neurosurgery
Director, Laboratory of Brain and Cognition

McGill
Centre universitaire de santé McGill
McGill University Health Centre

May 28, 2021

Reference for Banting Postdoctoral Fellowship: Dr. Colleen Hughes

Dear members of the adjudication committee,

I am very pleased to provide my strongest possible support for **Dr. Colleen Hughes'** application for the Banting Postdoctoral Fellowship. I am the Director of the Laboratory of Brain and Cognition at the Montreal Neurological Institute (MNI) and an Associate Professor in the Department of Neurology and Neurosurgery in the faculty of Medicine at McGill.

I invited Colleen to join my laboratory as a post-doctoral fellow in late 2019, having followed her doctoral research investigating the network neuroscience of social cognition and neurocognitive aging. This work closely parallels my own research interests, so I became aware of Colleen as an emerging young star in the field. As part of the interview process, I ask candidate Fellows in my laboratory to present at the Virtual Brain and Mind seminar series held at the MNI. This is a large gathering of scientists and trainees from across the MNI, with many others joining virtually from across Canada and abroad. Her presentation was a tour de force and left no doubt of her talents as a young scientist and the excellent fit between her career path and the mentorship opportunities I am able to provide in my laboratory. My early impressions of Colleen's talents and potential were both affirmed, and greatly elevated, by the stellar recommendations I received from her doctoral supervisors, Drs. Krendl and Sporns. To say that her two referees are leaders in their fields would be a gross understatement. Dr. Krendl's work has been extraordinarily impactful in characterizing the neural mechanisms underlying stereotype threat and stigma. Dr. Sporns is one of the foremost global leaders in network neuroscience, pioneering the application of graph theoretical methods to characterize the structural and functional network architecture of the brain.

Given her excellent pedigree, it will come as no surprise that Colleen hit the ground running when she joined my laboratory in July 2020. With the border closures due to COVID-19, Colleen was only able to physically join the lab in Montreal in late 2020. But this did not slow her progress nor diminish her extraordinary energy and enthusiasm for the research. In our initial meetings we developed a comprehensive research plan for her Fellowship, one that availed of the RUSH University Memory and Aging open access, longitudinal dataset. Within weeks of joining the lab Colleen was already presenting results in our weekly supervisory meetings. She took the germ of an idea from these early discussions and conveyed them into a sophisticated set of experiments and novel analytical methods to investigate longitudinal trajectories of neurocognitive aging and loneliness as outlined in her project proposal. From her limited background in loneliness and social isolation research just months ago, Colleen has now become the lab expert in sociality and aging. She is leading lab meetings and journal clubs and is already emerging as a strong mentor for junior trainees in the lab.

Despite her brief tenure in my lab, and the physical distance imposed by COVID-19 restrictions, Colleen produced a comprehensive set of behavioral findings that are helping us to decipher the complex and interacting relationships between sociality (loneliness and social isolation) and age-related cognitive and brain changes. This has required sophisticated, cross-lagged modeling approaches to both characterize and sequence the reciprocal influence of cognition on sociality and vice versa. We expect to have these data ready for publication in the coming months. Critically, these preliminary findings are foundational for her overarching program of research to examine both behavior and brain impacts of loneliness in normal aging and pre-symptomatic Alzheimer's Disease. In the context of the current public health crisis, it is important to reiterate that Colleen has access to all of the data necessary to successfully advance her program of research through the RUSH dataset and our ongoing collaborations with the longitudinal PREVENT-AD study of presymptomatic AD ongoing at the Douglas Hospital in Montreal. The socio-affective component of the next PREVENT-AD data collection wave, slated to begin in Summer 2021, has largely been shaped by Colleen who will lead this arm of the project as the senior post-doctoral fellow. She has already planned a comprehensive set of longitudinal analyses to interrogate this new data set over the next two years of her Fellowship here at the MNI.

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Over the 10 months Colleen has been a Fellow in my laboratory she has far exceeded my exceedingly high expectations. In addition to her core studies, Colleen has also taken the lead on a project applying advanced connectomics methods, using resting state derived individualized cortical parcellations to examine the impact of normal aging the sub-network level architecture the default network. She clearly has a natural talent for research, excellent experimental design, statistical modeling and analytical skills, incredible independence and drive and a gift for mentorship. She possesses that unique blend of creativity, collegiality, and a quiet confidence that is a potent recipe for a highly successful and impactful research career.

In the next two years of her Fellowship Colleen and I have agreed to work together to deepen her knowledge in the fields of advanced neuroimaging methods, neurocognitive aging and brain disease and social neuroscience. My laboratory is uniquely placed to support Colleen in developing her skills in each of these areas. I have recently received a five-year, multimillion dollar grant from the U.S. National Institutes of Health to study social isolation and its impact on neurodegenerative disease. I am a leading collaborator of the PREVENT-AD project and Colleen will be able to leverage this direct access to expand her knowledge of longitudinal neuroimaging methods and data modelling in the context of an emergent clinical syndrome. Towards this goal she was recently selected to attend the highly competitive CIHR Summer Program in Aging which focused on longitudinal experimental design and analyses in a neurocognitive aging context.

Beyond her scholarly pursuits, Colleen has been an excellent citizen of the academy as well a leader and mentor for junior trainees. As a doctoral researcher she mentored no less than 23 undergraduate trainees. Her mentorship in my lab now extends to my master's level and doctoral trainees and she is truly shining in her role as an academic advisor, mentor and contributor across all aspects of my research program. Throughout her training she has also been an active promoter and leader of women in science initiatives and is already demonstrating excellent service to the community through her academic and institutional advisory and review activities.

In short, Colleen has been an extraordinary early career scientist and trainee in my lab over this first year of her post-doctoral fellowship. She is focused on developing her skills towards what will undoubtedly be a highly impactful independent scientific career. I believe she is at the optimal point, both in her training and in her Fellowship research program, to maximally leverage the exceptional opportunities offered by the Banting post-doctoral fellowships program.

Please do not hesitate to contact me should you require further information or clarification.

Sincerely,

R. Nathan Spreng, PhD
Associate Professor
Director, Laboratory of Brain and Cognition
Department of Neurology and Neurosurgery
Montreal Neurological Institute

Brain changes associated with Alzheimer's disease (AD) are observed years before the emergence of the clinical syndrome. The pernicious subtlety of these changes suggests that the brain's structure and function may incur irreversible damage by the time of clinical diagnosis. To ameliorate these impacts, this proposal aims to identify **modifiable risk factors in the pre-symptomatic disease phase**. One such candidate is reduced sociality, which can be defined objectively (e.g., social network size) and subjectively (e.g., perceived social isolation), and predicts cognitive decline in AD. Moreover, cognition and subjective social isolation are associated with distinct yet interacting brain networks that show weaker **functional connectivity** in AD. However, few investigations dissociate the impacts of objective and subjective social isolation on cognitive and brain aging in the pre-symptomatic disease phase, which would inform future interventions. In the proposed work, I will investigate how objective and subjective social isolation uniquely affect and are affected by cognition during AD progression. This work leverages **longitudinal data from *two* large cohorts of older adults**: The Rush AD Center Memory and Aging Project (MAP; 1997-, N=2177) and the PREVENT-AD project (2011-, N=385). Both cohorts completed longitudinal assessments for a clinical diagnosis, a cognitive testing battery, neuroimaging, and separate measures of objective and subjective social isolation (Bennett et al., 2018, *J Alzheimers Dis*; Tremblay-Mercier et al., 2020, *bioRxiv*).

Aim 1: **Disambiguate how objective and subjective social isolation affect cognition during AD progression**. I hypothesize that greater baseline subjective versus objective social isolation will predict cognitive declines in AD progression from pre-symptomatic to symptomatic phases. I will use **longitudinal structural equation modeling** in the MAP cohort, due to its larger sample, to test for those cross-lagged effects and identify latent factors arising from brain + behavior measures of these constructs. I will then confirm that the observed effects replicate among participants for whom AD pathology was confirmed via post-mortem assessment.

Aim 2: **Investigate longitudinal interactions between social isolation, brain function, and AD biomarkers.** I hypothesize that subjective versus objective social isolation will be more strongly associated with longitudinal changes in brain health in older adults from the PREVENT-AD cohort at elevated AD-risk. I will use **multivariate analyses** to characterize brain connectivity distinctly related to subjective and objective social isolation and relate those metrics to longitudinal changes in **CSF-derived AD biomarkers (e.g., beta-amyloid and tau proteins)** unique to the PREVENT-AD cohort. If the hypotheses are supported, both aims would suggest a stronger role for subjective social isolation affecting cognitive and brain health in pre-symptomatic AD.

Impacts: The proposed work will make **three significant scientific contributions**: (1) it will identify subjective and/or objective social isolation as modifiable risk factors for AD, (2) clarify their temporal sequencing during disease progression, and (3) provide a roadmap for future multi-method investigations. As a **longer-term translational aim**, these data may inform more precise interventions to reduce the burden of social isolation in AD (e.g., emphasizing closer existing relationships versus increasing social interactions).

Feasibility: Because the data are already collected, data analysis and manuscript preparation – facilitating a career at a leading academic research institution – can feasibly be conducted during the two years of funding.

Applicant: Dr. Colleen Hughes

Proposed Referees (3):

1. Dr. Anne Krendl
    a. Relation to applicant: Doctoral advisor
    b. Affiliation: Associate Professor, Psychological and Brain Sciences Department, Indiana University
    c. akrendl@iu.edu
    d. https://psych.indiana.edu/directory/faculty/krendl-anne.html

2. Dr. Olaf Sporns
    a. Relation to applicant: Doctoral committee member
    b. Affiliation: Distinguished Professor, Psychological and Brain Sciences Department, Indiana University
    c. osporns@iu.edu
    d. https://psych.indiana.edu/directory/faculty/sporns-olaf.html

3. Dr. Michele Morningstar
    a. Relation to applicant: Arm's length referee
    b. Affiliation: Assistant Professor, Department of Psychology, Queen's University
    c. michele.morningstar@queensu.ca
    d. https://www.queensu.ca/psychology/people/faculty/michele-morningstar