

## The University of Toronto Scarborough Psychology and Neuroscience Departmental Students' Association (PNDA) 2023 Academic Research Panel



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### Abstract

The Psychology and Neuroscience Departmental Students' Association (PNDA) advocates on behalf of its members to the Department of Psychology at the University of Toronto Scarborough Campus and fosters academic excellence and career growth. PNDA provides academic and professional support by creating opportunities to interact and network with like-minded individuals while serving as a hub for all matters pertaining to Psychology, Mental Health studies, and Neuroscience programs, thereby connecting members, students, faculty, staff, organizations, institutions, companies, and communities. The Academic Research Panel (ARP) is an annual event focused on fostering research and student engagement amongst UTSC students specifically in the psychology, neuroscience, and mental health studies programs. Each year the ARP is led by undergraduate students from PNDA providing students with a platform to network and showcase their scientific work. This booklet is composed of abstracts from the presenting undergraduate students.

**Keywords:** neuroscience; psychology; mental health; social psychology; social identities; cultural differences; COVID-19

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### Conference Abstracts

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### Combating neuronal death in prion diseases using anti-prion compounds

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Prion diseases are lethal neurodegenerative diseases that result from misfolding of the normal prion protein form (PrP<sup>C</sup>) to the pathogenic misfolded (scrapie) form (PrP<sup>Sc</sup>). Prion diseases are characterized neuropathologically by spongiform degeneration and astrocytic gliosis in the central nervous system. Anti-prion compounds act to prevent the accumulation of pathogenic PrP<sup>Sc</sup> that causes neurodegeneration. This review explores anti-prion compounds, their different binding affinities, delivery modes, and future considerations for anti-prion compound development and discovery. Anti-prion compounds can be placed into four categories based on their binding affinity. These categories are (1) specific conformational stabilization, (2) non-specific stabilization, (3) aggregation and precipitation, and (4) interaction with other non-PrP<sup>C</sup> molecules. Anti-prion compounds that interact with non-PrP<sup>C</sup> molecules are more prevalent and effective. However, a combinatorial treatment intervention utilizing several anti-prion compounds with different binding targets and structures is the best approach to treating prion diseases as opposed to utilizing single compound treatments. Ideally, anti-prion compounds must be able to cross the blood-brain barrier and reach adequate whole-brain concentrations. If they are unable to cross the blood-brain barrier they can be administered intraventricularly or intrathecally, but this poses the risk of iatrogenic infection. Currently, there are no anti-prion compounds that are effective against human prions due to (1) an incomplete definition of prion disease pathology resulting in a lack of valid targets, (2) the inability of drugs to cross the blood-brain barrier and reach adequate

concentrations in the brain, (3) the toxicity of anti-prion compounds during chronic treatment and (4) the development prion strain resistance during chronic treatment. Anti-prion compounds can offer insights into treatments for these other neurodegenerative diseases. Breakthroughs in human prion treatments can be beneficial in treating other neurodegenerative diseases that occur due to protein misfolding and aggregation like Alzheimer's, Huntington's, and Parkinson's disease.

### **Investigating Canadian immigrants' time resided and sense of identity and acculturation**

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Understanding acculturation through the lens of cultural identity has been an area of focus for research and the utility of a diverse theoretical model is useful to reflect the complex factors associated with identity and acculturation. As adolescents and emerging adults settle into their host country, their identity is rapidly developing which further affects immigrants' sense of identity and acculturation. The recently devised theoretical model of cultural identity negotiation (MCIN) for emerging adult immigrants (EAI) highlights the four approaches to cultural identity negotiation, which EAI can use when exploring and forming their sense of identity in Canada. However, given the MCIN for EAI's novelty, there has not been any research on whether it is an appropriate model that reflects identity in Canadian immigrant youth, the relationship between adolescent immigrants' acculturation and identity with time resided in Canada. In the current study, I will analyze the concurrent validity of the MCIN for EAI in Canadian immigrant youth to determine whether the test is an accurate measure of cultural identity in adolescent immigrants. With the MCIN for EAI being an all-encompassing and diverse theoretical model, an adapted version of the interview protocol will be used to test the reliability and validity of this model. Based on previous research on the effect of acculturation and sense of identity on immigrants, I hypothesize that through the MCIN for EAI, there will be a positive correlation between time resided in Canada and sense of identity as well as acculturation. The results of this study will guide clinicians' decisions to incorporate this novel theoretical model in academic and clinical settings.

### **Examining the role of aesthetic experiences in self-realization and self-transcendence: A thematic analysis**

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Numerous academics, philosophers, and aestheticians emphasize the importance of a life filled with beauty (Howell et. al., 2017). Thus, appreciating aesthetic experiences is pivotal for self-discovery and self-transcendence. Despite theoretical prominence, little qualitative research has been done on this topic. This study's objective emphasized two questions guiding the inquiry; What is the role of aesthetic encounters in aiding self-realization or individuation? and, How do these experiences foster self-transcendence? A thematic analysis was performed on (N=25) interviews and their results revealed seven themes underlying self-realization: a) Losing yourself to find yourself; b) Relatability and self-reflection in art; c) Identity as a collection of skills; d) Art as a means of self-expression and acknowledgement; e) Aesthetic Genres and Taste as identity; f) Belonging and Social-identity through art, and g) Personal-interest and choice in artistic consumption. Seven themes for the second research question of self-transcendence: a) Mother nature's beauty; b) Intense, Passionate and overwhelming experience of heightened consciousness, c) Sacred Symbolism, Archetypal Imagery, and the Collective-Unconscious, d) Collective-Effervescence, Social Connection & Shared meaning; e) The 'Profound' found in the mundane & everyday; f) Feelings of spiritual-elevation and wellbeing; and g) Self-reference and meaning-making through art. These findings evidenced personal growth and meaningfulness experienced through aesthetic experiences.

### **Post-COVID lockdown, the media, and mental health**

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The global COVID-19 pandemic presented numerous new challenges for the mental health of Canadians. The most notable struggles include termination from work and/or continuous unemployment, loss of or fear of losing loved ones due to COVID-19 infection, and general anxiety about the pandemic as a novel and developing threat. There was also a rise in anti-Asian racist incidents, in addition to increasing acknowledgement of police violence against Black and Indigenous and people of colour (BIPOC) in the United States, both of which commonly came to public attention by way of cell phone

videos surfacing on social media. While many were confined to their homes due to public health restrictions beginning in March 2020 and lasting until 2021, Canadians often accessed information about current events solely through social media and other online channels. For this reason, the COVID-19 pandemic is the first to have occurred in the age of deep digital integration, characterized by constant streams of unfiltered clinical information being consumed daily. The need for responsible and effective media campaigns to support greater self-care, self-awareness, and self-management is imminent in order to combat the multitude of mental health concerns of the public. In response to the current need for online mental health support, this paper examines the quality of mental health resources in popular media. Ten youth who frequently consume television and social media assessed advice presented by mental health professionals from various media sources based on the levels of: 1) uniqueness of advice, 2) cultural relevance, required to meet the needs of Canada's diverse population; and 3) the amount of data used to support claims.

### **A review on longitudinal relationships between smart device usage and negative mental health outcomes**

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The average time people spend on smart devices has been increasing. Previous research has shown that smartphone use is linked to poor mental health. However, the evidence for the association between them has been limited by a number of shortcomings including a lack of longitudinal relationship established and narrow selections of mental health indicators. A literature review was completed for 8 weeks with sample sizes ranging from 332 to 7818 participants to evaluate the current evidence on the longitudinal association between changes in using smart devices and multiple indicators of mental health in adolescents. We found evidence to suggest that there are longitudinal associations between changes in smart device usage and negative mental health outcomes in terms of conduct problems and poor psychological well-being. The main moderators include household income, parental education level, and socioeconomic location in the neighbourhood. We also found that changes in smart device use were negatively associated with changes in mental health symptoms including emotion, depression and anxiety disorder. Additionally, the causal relationships between mobile phone addiction and depressive symptoms were bidirectional across time. Future studies may examine device activities beyond the use of time and frequency. The motivation underlying technology use, as well as the contextual information about who they are with when using the device, could be considered.

### **Brain-wide neural activity signatures of restraint stress**

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Stress can affect cognition, with the outcome (facilitation or impairment) depending on a combination of factors related to both the severity of the stress and its rate of occurrence (acute or chronic). Specifically, mild and acute stress can be beneficial to cognition, for example enhancing learning and preventing the forgetting of aversive memories, whereas severe and chronic stress can be detrimental. While it is known that stressful events can improve or impair memory, the neural correlates of these bidirectional effects on memory remain poorly understood. Preliminary data from our lab has shown that 1hr of acute physical stress significantly reduces long-term fear memory when measured 24hrs later. However, fear learning and short-term fear memory retrieval (measured 1hr after training) are unaffected. Furthermore, activation of parvalbumin interneurons in the amygdala, a brain region implicated in emotional processes, rescued the stress-induced memory deficits. These data fill a gap in the literature regarding the effects of acute, severe stress on learning and memory, suggesting a role for parvalbumin interneurons within the amygdala in mediating stress-induced amnesia. To expand our understanding of the macrocircuit modulation of these effects, we will assess the effects of 1hr physical stress on brain-wide neuronal activity using immunohistochemistry against cFos, a marker for neuronal activity.

### **Sexism in parental processes of socialization impacts academic performance of females**

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The differences in the practices parents adopt when socializing their children can have lasting implications regarding the pursuit of academic achievement in schooling. Society has enforced parents to acquire different sets of processes when socializing with males compared to females, and the differences in these processes may work to negatively impact females on

performing optimally in educational settings. There is undoubtedly sexism that is inextricably linked to the process of socialization in a child's development. The thoughts, values and beliefs of females are largely learnt through parents' socialization, leading to the formation of self-concepts that may feel unequal to ones formed by boys their age which may cause girls to be less secure and confident in their abilities. Another aspect within this process entails how parents may show implicit sexist attitudes towards daughters during early development, they may believe that certain academic fields of study are of less use to girls or may simply expect less performance from girls in academic achievement. This paper hypothesizes that the sexism intertwined in socialization leads to the creation of unequal self-concepts in females which undermines their ability to perform optimally in an educational setting.

### **The psychological impact of cancer patients' caregivers and counselling interventions**

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Counselling interventions are linked with a family caregiver's psychological well-being in caring for a cancer patient. The study sought to establish the association between a family caregiver's psychological well-being and counselling interventions when caring for cancer individuals. The study methodology was a correlational study design that examined the extent to which two or more variables are associated. The study area has a sample size of 96 participants. Systemic random sampling was used to identify households that participated in the study. The participants selected for this study met the inclusion and exclusion criteria. Only 65 respondents participated in the study while 12 declined the rest were unavailable. The study found gender (Male 55.4%; Female 44.6%), level of education (High school 53.8%, none 3.1%, and university 43.1%) and employment status and income (Employed 44.7%, retired 29.2%, and unemployed 23.1%; mean income \$ 3881) to be significant factors in influencing an individual's psychological well-being when providing family cancer-care. Gender and equity-focused palliative care can be performed by anybody depending on circumstances like family caregiving. The majority in the study area were retired or unemployed suggesting that they will be negatively impacted psychologically when caring for a cancer patient due to limited resources. On the other hand, most of the residents in the study area were educated. Their level of education enables them to appreciate counselling intervention to minimize the negative impacts of providing family cancer care. Also, they can understand and know the importance of family caregiving.

### **Internet usage can reduce cognitive decline amongst older adults during COVID-19**

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Cognitive Decline is an unchangeable deterioration of the brain's cognitive function, affecting memory, attention, and problem-solving abilities. It is often developed within individuals aged 45-60 and continues thereafter, making it detrimental to daily tasks. Prior research has stated that among US adults aged 65+, internet usage has consistently expanded from 12% in 2000 to 67% in 2016. In addition to the recent consequences of the COVID-19 pandemic, these percentages for internet usage and cognitive decline have increased. This literature review investigates the research on internet usage affecting cognitive decline among older adults in areas the pandemic influenced. Topics of exploration include internet usage, social isolation, social relationships, frequency and types of technology, and age group differences. Various types of peer-reviewed literature (longitudinal studies, literature reviews, and research articles) were discussed within these areas of interest. Through examination, numerous factors affect a person's internet usage such as employment and economic status. Studies show that internet usage can reduce social isolation, and can maintain social relationships as well as improve cognitive abilities. Type of internet use indicated that the internet is a tool for accessing and processing information and vital for social participation. However, there are negative impacts of frequent internet usage leading to addiction and reduced happiness. Negative effects are discussed mostly with younger age groups than older adults creating a positivity bias. Overall, internet usage can be a vital tool for older adults to maintain their cognitive function in controlled amounts. There are limitations within the presented studies as there were no standardized tests for internet use, positivity bias, and there was a disparity among internet skills and age cutoffs, which are areas for future research.

### **Understanding the experiences of male undergraduate students**

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Gender is socially produced differences between feminine and masculine identities. Researchers often critically assess gendered power relations and the normative experiences of males. However, given changes in social factors, environmental conditions, and the evaluations of power, it's important to recognize the experiences of males. This study aimed to understand the experiences of masculine identities through a comprehensive lens focusing on intersectionality, stereotypes, and self-concept. A focus group study was conducted with 20 male participants from the University of Toronto Scarborough community. The results of this study indicate that one's intersectional identities play a significant role in their experiences. Similarly, participants clearly understand stereotypes that impact their experiences while denoting how those with masculine identities may be privileged and viewed as oppressors. Lastly, their self-concept is often thought about as their sense of belonging and ability to complete tasks that align with their roles in different settings (i.e., student, child, etc.). Some limitations of this study include the underrepresentation of White males and the use of only open-ended questions to understand participant experiences. Future directions of this study include increasing the study's sample size and employing diverse measures to understand the experiences of males with different intersectional identities.

### **Using SCR and frequency domain analysis of EEG characteristics to explore various bands during acute stress**

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There is an overall increase in frontal EEG activity during acute stress. The presence of a high theta/beta ratio, and high beta waves indicate acute stress. We showed our participants stress-inducing images to elicit a stress response. To measure acute stress in our participants, we collected single-channel EEG data from two electrodes and skin conductance response (SCR) data from the right hand. Results show a strong positive relationship between high beta waves and average SCR, as well as the theta/beta ratio and SCR during stress-inducing trials. While our study is severely underpowered regarding participant count and EEG measurement channels, we still demonstrated an increase in high beta waves, overall frontal EEG activity, and in the theta/beta ratio as indicators of acute stress.

### **Pilocytic astrocytoma diagnosis and treatment**

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Pilocytic astrocytoma is a form of a brain tumour in which diagnostic timing is important for proper therapy. This type of brain tumour, which is common in young people and children, is brought on by the rapid cell division of astrocytes in the central nervous system. Despite being slow growing, this tumour has the potential to spread throughout the central nervous system, disrupting several neurological impulses and operations. Pilocytic astrocytoma can obstruct the brainstem's normal operation, which can cause issues with breathing, swallowing, and blood pressure control. Also, this brain tumour can cause intellectual and learning disabilities in the patients afterwards. All these negative effects suggest the need for increased investment in this area of study. Findings support a high percentage of successful treatment. Therefore, the crucial stage in treating this kind of brain tumour is proper diagnosis and recognizing the presence of the tumour early. This research is a literature review of previous studies done about the causes, diagnosis, and treatment of pilocytic astrocytoma. The purpose of this research is to assess available treatments and diagnosis approaches for providing better care to patients.

**Lived experiences of second-generation immigrant students: Integrating cultural and ethnic backgrounds**

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The undergraduate population at the University of Toronto Scarborough (UTSC) is diverse, with a large proportion of students directly from neighbouring communities. Students that identify as second-generation immigrants from an ethnic minority group, experience unique barriers that influence their lived experiences. This research study aims to understand how intersectionality (Canadian and ethnic minority background) impacts experiences regarding identity, stressors, misconceptions, and representation for this community of students. This study conducted focus-group discussions on the experiences of ethnic minority second-generation immigrant (n = 26) students. Undergraduate students were recruited and asked to answer questions that evoked meaningful small-group discussions on their intersectional identity. A preliminary analysis of the qualitative data was conducted by two raters who thematically coded students' responses separately. Then the two raters conducted further analysis to find emerging themes. Results show that students felt growing up in a multicultural community, made integration of their social identity easier into mainstream culture. Students reported stressors around education, occupation, and financial situations. They voiced misconceptions about language, autonomy in education, and cultural background regarding their respective identities. Many students reported not hearing about their social identities within their university classrooms. They expressed the need for an accurate representation of their intersectional identity through professors themselves, course content, or open discussions. Students want others outside this intersectional identity to acknowledge their privileges and have an open mindset around different social groups. The implications of this research include interventions to help integrate second-generation students into campus life; through student and faculty mentors, group discussions on identities, and applications like educational tools. This research provides insight into creating an inclusive campus, reflective of the diverse student population.

**Conflicts of Interest**

The author(s) declare that they have no conflict of interest.

**Authors' Contributions**

FF: Served as the Chair of the Planning Committee for the conference, drafted the abstract booklet, assisted authors with their abstract submissions and gave final approval of the version to be published.

MK: Served as a member of the planning committee for the conference, assisted authors with their abstract submissions, and gave final approval of the version to be published.

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