



Department of Psychology

The University of Hong Kong

香港大學心理學系

# 10<sup>th</sup> Departmental Research Postgraduate Symposium

November 07, 2024  
(Thursday)

Time: 09:30a.m – 1:30p.m.

Venue: The Chamber, 11/F, JTC  
(Oral Presentations)

Room 1103-04, 11/F, JTC  
(Poster Presentations)

**The University of Hong Kong  
Department of Psychology**

**10<sup>th</sup> Departmental Research Postgraduate Symposium**

**November 07, 2024 (Thursday)**

**<Chamber and Room 1103-04, 11/F, Jockey Club Tower, Centennial Campus>**

**(A) 09:30 a.m. (Opening Remarks), <Venue: Chamber, 11/F >**

**(B) 09:40a.m. (Oral Presentations), <Venue: Chamber, 11/F >**

No.	Time	Name of Student	Programme/Year	Name of Supervisor	Title of Oral Presentation	Field of Study
O1	9:40a.m. - 10:00a.m.	BEI, Ying Ying Ellen	MPhil/Year 2	Professor SAUNDERS, Jeffrey	Investigating Sensory Weighting During Postural Control Using Virtual Reality	Cognitive Psychology; Visuomotor behavior
O2	10:00a.m.- 10:20a.m.	JIN, Run Rachel	PhD/Year 2	Professor LEE, Tatia Mei Chun	Longitudinal Changes in Brain-Age Gap and Its Relationship with Neurocognitive Function and Alzheimer's Disease Pathology	Neuropsychology
O3	10:20a.m.- 10:40a.m.	QIAN, Chenyi	PhD/Year 2	Professor CHANG, Hue Fung Dorita	Altering Sensory Eye Dominance Using Monocular Deprivation	Visual Neuroscience
O4	10:40a.m.- 11:00a.m.	ZHANG, Yuqi	PhD/Year 3	Professor HU, Xiaoqing	Deciphering Emotional Memories Re-Processing During Human Sleep	Cognitive Neuroscience

(C) 11:15a.m. (Poster Presentations), <Venue: Room 1103-04, 11/F>

No.	Name of Student	Programme/Year	Name of Supervisor	Title of Poster Presentation	Field of Study
PA1	ZHENG, Qingzi	PhD/Year 2	Professor CHANG, Hue Fung Dorita	Indexing Sensory Eye Dominance	Visual Neuroscience
PA2	CHENG, Wing Yee	PhD/Year 2	Professor CHAN, Wai Sze	Understanding the Interplay of Sleep, Stress, and Emotional Eating: A Multi-Method Approach	Psychology
PA3	CHUNG, Ho Fung	PhD/Year 2	Professor CHEUNG, Sing Hang	Identifying the General Mechanism of Change in Third-Wave Psychotherapies Using Exploratory Bifactor Analysis	Cognitive Psychopathology
PA4	YIH, Imogen Yong Xin	PhD/Year 2	Professor JIN, Frances Jingwen Professor CHEUNG, Sing Hang (Co-supervisor)	Elucidating the Cognitive and Computational Mechanisms of Threat-Related Perceptual Decision-Making under Top-Down Attention Modulation	Cognitive Neuroscience
PA5	DONG, Na	MPhil/Year 2	Professor LAM, Charlene Professor LEE, Tatia Mei Chun (Co-supervisor)	Screen Media Activities Longitudinal Impact on Brain Architectures, Mental Health and Psychopathology in Early Adolescence	Psychology
PA6	PAN, Yue	MPhil/Year 2	Professor LI, Shirley Xin	Sleep Variability and Its Association with Circadian Biomarker and Depressive Symptoms in Youths with Delayed Sleep Phase Disorder and Insomnia Disorder	Sleep disorders - Circadian rhythms
PA7	SHEN, Ye Helen	MPhil/Year 2	Professor LEE, Tatia Mei Chun	The Comprehensive Approach of Multimodal Retinal Ganglion Cell Data Analysis to Mark Aging	Psychology
PA8	WONG, Mei Sze	MPhil/Year 2	Professor WONG, Tin Yau Terry	The Roles of Spatial Ability and Visuospatial Working Memory Capacity on Cognitive Mapping Performance	Spatial Cognition

No.	Name of Student	Programme/Year	Name of Supervisor	Title of Poster Presentation	Field of Study
PA9	MU, Zexuan	PhD/Year 2	Professor Hu, Xiaoqing	Event Boundaries in Memory Formation and Retrieval of Naturalistic Experience: A Neurophysiological and Behavioural Perspective	Cognitive Neuroscience
PA10	LIANG, Li	PhD/Year 2	Professor LEE, Tatia Mei Chun	Predicting Recovery from Acute Stress Through a Resilience Index Developed by Integrating Multiple Physiological Responses to The Trier Social Stress Test	Psychology
PB1	HONG, Jun Kerina	PhD/Year 2	Professor SHUM, Kar Man Kathy	Parents' Emotional Regulatory Flexibility and Children's Psychological Resilience: Longitudinal Mediation through Children's Emotional Regulatory Flexibility in Two Cultures and the Context of Autism	Developmental Psychology (Autism Spectrum Disorder, Emotion Regulation, and Psychological Resilience)
PB2	SONG, Xiaoqi Vicky	PhD/Year 2	Professor LEE, Tatia Mei Chun	Lower Functional Connectivity State Transitions During Affective Processing Correlate with Subsequent Impairment in Sustaining Positive Affect in Subthreshold Depression	Cognitive Neuroscience
PB3	TAN, Joo Wee	PhD/Year 2	Professor CHEUNG, Sing Hang	Meta-Analytic Structural Equation Modelling (MASEM) in the Cognitive Framework of Working Memory and Fluid Intelligence: Does Attention or Speed Matter?	Cognitive Psychology
PB4	CHEN, Si Catherine	MPhil/Year 2	Professor CHENG, Cecilia	Conceptualization of Digital Well-being	Social and Health Psychology
PB5	WONG, Yee Lok	MPhil/Year 2	Professor LI, Shirley Xin	The Association between Impulsivity and Anxiety in Adolescents with Insomnia: The Moderating Role of Evening Chronotype	Clinical Psychology

No.	Name of Student	Programme/Year	Name of Supervisor	Title of Poster Presentation	Field of Study
PB6	WU, Yu	PhD/Year 2	Professor BECKER, Benjamin	Hierarchical Structure and Brain Mechanisms of Humans' Reward Experiences	Cognitive Neuroscience
PB7	JIN, Yujing Fiona	PhD/Year 2	Professor LI, Shirley Xin	Reward Processing and Eveningness in Youth Depression	Sleep and Psychopathology
PB8	ZHANG, Qi Kate	PhD/Year 5	Professor CHAN, Wai Sze	Trajectories of Sleep and Depressive Symptoms in Chinese Women from Late Pregnancy to the Early Postpartum Period: A Longitudinal Cohort Study	Sleep and Postpartum Depression
PB9	ZHANG, Yinghao Lexi	PhD/Year 2	Professor JIN, Frances Jingwen	Active Inference Modelling Delineates Interpersonal-Coordination Patterns Across Different Symptom Dimensions of Schizophrenia	Schizophrenia, Computational Modelling, Active Inference

# **Oral Presentations-Abstracts**

<b>Oral Presentation:</b>	O1
<b>Name of Student:</b>	BEI, Ying Ying Ellen
<b>Name of Primary Supervisor:</b>	Professor SAUNDERS, Jeffrey

## **Investigating Sensory Weighting During Postural Control Using Virtual Reality**

Postural control is a vital perceptual-motor process involving sensory information from visual, somatosensory, and vestibular systems to maintain stability. Challenges in postural control extend to virtual reality (VR) environments, leading to issues like vertigo and motion sickness during middle to long-term exposure. This study proposes a research plan to investigate visual weighting in postural control, focusing on the dynamic nature of sensory integration and reweighting. The pilot study aims to develop and validate a method for measuring visual weighting using a new VR perturbation paradigm, using a virtually swaying room as a visual perturbation and measuring the participants' body response. Subsequent studies will explore changes in visual weighting under varying visual information conditions, assess visual reweighting during VR exposure, analyze individual differences in sensory weighting predicting motion sickness, and test sensory weighting in special groups with unique vestibular characteristics. Since this process is especially critical in aging individuals, where deficits in sensory processing systems can significantly impact stability, the responses from the elderly and the athletes will be compared by this paradigm. The research plan combines experimental paradigms, including Romberg ratio measurements, continuous psychophysical modeling, and motion sickness rating sessions, to comprehensively evaluate the relationship of motion sickness, postural instability, visual & vestibular components in postural control in VR environment. By adjusting the impact of visual uncertainty, noise, and adaptation, this study seeks to enhance our understanding of postural control mechanisms and inform interventions to improve balance maintenance and reduce motion sickness in diverse populations.

**Keywords:** Postural control, Virtual Reality, motion sickness

<b>Oral Presentation:</b>	O2
<b>Name of Student:</b>	JIN, Run Rachel
<b>Name of Primary Supervisor:</b>	Professor LEE, Tatia Mei Chun

## **Longitudinal Changes in Brain-Age Gap and Its Relationship with Neurocognitive Function and Alzheimer's Disease Pathology**

**Background:** In the context of global population aging, early identification of potential neurocognitive decline is crucial for the timely management to counter the adverse effects on older people's independence in activities of daily living. Brain-Age Gap, an index generated by a computational algorithm based on neuroimaging data, is useful for reflecting the discrepancy between an individual's chronological age and predicted brain age. Previous research identified that the larger the Brain-Age Gap, the higher the chance of age-inappropriate neurocognitive decline. However, the difference in the longitudinal changes in the Brain-Age Gap and its relationship with cognitive performance and Alzheimer's disease-related pathology remains an unresolved yet valuable question.

**Method:** Participants were recruited and assessed longitudinally under the cohort of Alzheimer's Disease Neuroimaging Initiative (ADNI). We selected participants with at least three MRI scans, ensuring time intervals exceeded 90 days. The resting-state functional connectivity matrices served as features for the Brain-Age prediction model. Here, the model was trained on a separate cognitively healthy control cohort (N = 201). We then applied the best-performance prediction model to gain the predicted brain age and the Brain-Age Gap for cognitively healthy controls (HC) and individuals with Mild Cognitive Impairment (MCI) at each time point.

**Results:** Our best model achieved good performance with MAE = 4.58. Both chronological age and Brain-Age Gaps were not significantly different between HC (N = 103) and people with MCI (N = 138) at any of the three time points. Chronological age and Brain-Age Gaps were highly correlated at the three time points. Interestingly, the longitudinal changes in Brain-Age Gaps, quantified by their standard deviation, were significantly different between HC (M = 3.56) and MCI (M = 4.33),  $t(239) = -2.57$ ,  $p = 0.011$ . Larger longitudinal changes in the Brain-Age Gap were correlated with larger future changes in general cognitive status, poorer future memory and visual-spatial performance, and more severe neuropsychiatric and depressive symptoms. Additionally, baseline plasma neurofilament light, A $\beta$  42/40 ratio, and cerebrospinal fluid A $\beta$  42 were associated with the longitudinal changes in Brain-Age Gaps in the future.

**Conclusion and Implication:** Present findings demonstrate the necessity of incorporating longitudinal neural and biological information in monitoring neurocognitive decline and offer tremendous benefits for translational applications by providing a robust predictive tool that can be generalized to at-risk populations for predicting and managing age-inappropriate impairments. These findings have translational implications by providing a quantifiable supplementary index to predict future changes in neurocognitive status and emotional states, enabling timely and personalized interventions to promote individual well-being.

**Keywords:** Brain-Age Gap, Cognitive Aging, Longitudinal Changes, Mild Cognitive Impairment



<b>Oral Presentation:</b>	O3
<b>Name of Student:</b>	QIAN, Chenyi
<b>Name of Primary Supervisor:</b>	Professor CHANG, Hue Fung Dorita

## **Altering Sensory Eye Dominance Using Monocular Deprivation**

Sensory eye dominance refers to the differential weighting of inputs from the two eyes by the brain. Recent studies have demonstrated that short-term monocular deprivation can improve sensory eye dominance in the adult visual system, by enhancing the dominance of the deprived eye. However, previous studies have varied regarding the tasks used to measure sensory eye dominance and the eye chosen for deprivation. Here, we aimed to test the mechanics of short-term deprivation-induced changes in sensory eye dominance, querying the roles of the deprived eye (dominant vs. non-dominant) and whether effects hold across different task indices (dichoptic motion and letter polarity tasks).

Thirty-two adults with normal or corrected-to-normal vision participated in the experiments. Monocular deprivation was achieved using dichoptic movie presentations for 150 minutes. Participants experienced deprivation of either their dominant or non-dominant eye during two sessions, with a minimum 48-hour interval between them. Sensory eye dominance was assessed using the dichoptic motion and letter polarity tasks at four time points: baseline measurements, and 0-, 15-, and 30-minutes post-deprivation.

We observed a significant shift in sensory eye dominance toward the deprived eye, with deprivation of the non-dominant eye yielding a longer-lasting deprivation effect compared to that of the dominant eye. The letter polarity task demonstrated greater sensitivity and consistency in detecting shifts in sensory eye dominance than the dichoptic motion task. In follow-up studies examining the long-term retention of the letter polarity task, we found that deprivation of the dominant eye resulted in a retention effect lasting 72 hours, while deprivation of the non-dominant eye led to a retention effect of 168 hours.

Our findings suggest that depriving the non-dominant eye while indexing dominance utilizing the letter polarity task produced the most pronounced shift in sensory eye dominance. We conjecture that the two tasks' differences in sensitivity towards revealing the deprivation effect reflect their engagement with distinct neural substrates. In addition, the prolonged effect of depriving the non-dominant eye might stem from the stronger homeostatic response aimed at countering the greater suppression exerted by the dominant eye, whereas depriving the dominant eye disrupts this homeostatic balance, resulting in a shorter deprivation effect.

<b>Oral Presentation:</b>	O4
<b>Name of Student:</b>	ZHANG, Yuqi
<b>Name of Primary Supervisor:</b>	Professor HU, Xiaoqing

## **Deciphering Emotional Memories Re-Processing During Human Sleep**

### **Introduction:**

Sleep constitutes a privileged state for memory consolidation, including memories with strong emotional charges. While sleep plays an instrumental role in emotional re-processing, the specific mechanisms involved in the offline processing of overwhelmingly aversive experiences (e.g., traumatic memory) remain unclear. Specifically, Traumatic experiences often disrupt the regular temporal sequence of events, resulting in fragmented and disorganized memories that constitute core symptoms of post-traumatic stress disorder. Here we explored how sleep is involved in the re-processing of trauma vs. neutral memories, and how such processing impacts the temporal memory structure of trauma experience using a well-established lab trauma film paradigm.

### **Method:**

43 healthy participants spent three nights in the laboratory. The first night was an adaptation night. In two subsequent experimental nights, scheduled one week apart, participants were exposed to either trauma or neutral films. Participants performed several tasks, including a film-clips encoding task, multiple mood ratings, and pre- and post-sleep temporal memory tests. Electroencephalogram (EEG) data were continuously recorded throughout the two experimental nights.

### **Results:**

Watching trauma films increased negative feelings relative to watching neutral films, persisting during the pre-sleep period and gradually returning to baseline after sleep. Positive emotions exhibited the opposite pattern. Temporal memory accuracy, measured by temporal distance between multiple screenshots, was higher during the trauma film session ( $F(1, 42) = 7.821, p = .007$ ). Notably, we found a significant film type (trauma vs. neutral) by time (pre- vs. post-sleep) interaction ( $F(1, 42) = 5.947, p = .019$ ): temporal distance errors decreased across the neutral film watching sleep, yet remained unchanged across the trauma film watching sleep. Furthermore, analogue trauma exposure significantly altered sleep macrostructure in comparison to microstructure, as evidenced by shorter sleep time ( $p = .025$ ), increased sleep onset latency ( $p = .014$ ), increased REM sleep percentage ( $p = .028$ ), and decreased sleep efficiency ( $p = .048$ ).

### **Conclusion:**

Our findings suggest traumatic experiences significantly alter the macrostructure of sleep more so than its microstructural characteristics. Moreover, sleep aids in the adaptive processing of negative emotions induced by traumatic experiences. Lastly, neutral memories may be stored in an organized manner for easier retrieval and temporal sequence reconstruction, while traumatic memories may be stored more distinctly due to their aversive nature and intense arousal. Interestingly, such differences disappear overnight, indicating that sleep might preferentially consolidate neutral memories relative to its traumatic counterpart, and reduce errors related to temporal distance post-sleep.

# **Poster Presentations-Abstracts**

<b>Poster Presentation:</b>	PA1
<b>Name of Student:</b>	ZHENG, Qingzi
<b>Name of Primary Supervisor:</b>	Professor CHANG, Hue Fung Dorita

### **Indexing Sensory Eye Dominance**

We are interested in indexing sensory eye dominance with tasks that show consistent and reliable results. We compared two main types of tasks: *integrative tasks* that require combining information from both the left eye and the right eye; and *rivalrous tasks*, where significantly different images are presented across the two eyes, and one eye's information must be suppressed. For each type of task, we introduced three variations/tests: integrative tasks included 1) phase combination, 2) signal-in-noise motion, 3) signal-in-noise orientation tests, and rivalrous tasks included 1) letter rivalry, 2) motion rivalry, 3) dichoptic masking tests. We also added a depth perception task to test for any correlation between depth perception (which require binocular vision) and sensory eye dominance. Our results show that the three variants of the integrative tasks generated higher classification consistency in identifying the dominant eye than the three rivalrous tasks did. Task validity was examined by testing whether a task outcome correlates with that from another task. Although no clear correlation was observed among the three tasks within the rivalrous task category, a significant correlation between tasks was observed for the integrative tasks. Specifically, the outcome of signal-in-noise motion task is significantly correlated with that of signal-in-noise orientation task. In terms of reliability, we found that all tasks were reliable, because repetition of the same task did not yield different outcomes. We did not observe a clear correlation between the magnitude of sensory eye dominance and depth perception. Together, these data show that when indexing sensory eye dominance, it is best to consider the task metric used, and the possibility that they may engage different visual functions.

<b>Poster Presentation:</b>	PA2
<b>Name of Student:</b>	CHENG, Wing Yee
<b>Name of Primary Supervisor:</b>	Professor CHAN, Wai Sze

## **Understanding the Interplay of Sleep, Stress, and Emotional Eating: A Multi-Method Approach**

Emotional eating, defined as overeating in response to stress and negative emotions, has adverse impacts on physical and mental well-being. Emotional eating can be exacerbated by short sleep and stress. However, previous experimental studies have reported mixed findings, with meta-analysis concluded increased food intake under negative emotions (Cardi et al., 2015) and another concluded no significant effect (Evers et al., 2018). Additionally, the role of sleep duration as a potential determinant of this relationship remains unclear and the existing laboratory studies have limited ecological validity. This study aims to clarify the relationship between sleep, stress, negative emotions, and daily dietary intake using a multi-method approach that incorporates ecological momentary assessment (EMA) into a randomized cross-over experimental design with comprehensive daily dietary recall interview. We hypothesize that shorter sleep duration will be associated with increased stress and more negative emotions the next day, which will in turn predict increased caloric intake in the following day.

Eighty adults with elevated tendencies toward emotional eating over the past three months will be recruited from the local community. Eligibility will be determined by a score of 3.25 or higher on the emotional eating subscale of the Dutch Eating Behavior Questionnaire (DEBQ, Wu et al., 2017). To examine the effects of sleep duration, participants will undergo two different sleep conditions on weekdays: partial sleep deprivation (three consecutive nights of less than five hours in bed) and normal sleep condition (three consecutive nights of more than seven hours in bed). Participants will wear an actigraph device to objectively measure total sleep time. They will receive five daily prompts to report momentary stress levels and emotional states over the day. At night, they will complete 24-hour dietary recall interviews with a research assistant to record daily food consumption.

Multilevel modeling will be used to analyze how sleep duration, stress, and negative emotion correlate with food consumption.

The findings from this multi-method approach will enhance our understanding of the complex interplay between sleep, stress, emotions, and emotional eating. Clarifying this relationship is crucial, as emotional eating is linked to public health crises such as obesity (Dakanalis et al., 2023). Insights from this study can inform the development of sleep-related interventions to help individuals better manage stress, regulate emotions, and improve eating habits. Importantly, the evidence will be collected in more naturalistic contexts, allowing us to better understand the real-world mechanisms underlying problematic eating behaviors.

<b>Poster Presentation:</b>	PA3
<b>Name of Student:</b>	CHUNG, Ho Fung
<b>Name of Primary Supervisor:</b>	Professor CHEUNG, Sing Hang

## **Identifying the General Mechanism of Change in Third-Wave Psychotherapies Using Exploratory Bifactor Analysis**

**Backgrounds:** The effects of third-wave psychotherapies on psychological symptoms (PS) are well established, but little do we know how they work. Different third-wave psychotherapies propose distinct mechanisms of change (MC) which, when manipulated, can achieve symptom improvements. Since third-wave psychotherapies share a common focus of emotion openness, awareness to the present, and meaning-making, third-wave psychotherapies might improve PS through a general mechanism rather than through multiple, distinct MCs.

**Aims and hypotheses:** The aim of this study is two-folded. First, it explores whether third-wave psychotherapy MCs can be adequately represented by a general MC. Second, it explores whether some third-wave psychotherapy MCs are more core to facilitating psychotherapeutic changes.

**Methods:** Six-hundred young UK adults aged 18 to 30 will be recruited through Prolific. Upon consent, participants will complete a questionnaire battery of third-wave psychotherapy MCs, including the *Five Facet Mindfulness Questionnaire*, the *Non-attachment Scale Short Form*, the *Acceptance and Action Questionnaire-II*, the *Cognitive Fusion Questionnaire*, the *Metacognition Questionnaire*, the *Difficulties in Emotion Regulation Scale*, and the *Self-Compassion Scale*.

We will perform exploratory factor analysis on the item-level data of the questionnaire battery. Parallel analysis and model fit inspection will be used to determine the optimal number of factors retained. Then, we will perform confirmatory factor analyses and fit the data into four factor models (unidimensional model, correlated factor model, second-order model, and bifactor model). All factor models will be fitted using weighted least squares estimation. For all models, we report the  $\chi^2$  goodness-of-fit statistic, CFI, RMSEA, and SRMR. We will adopt the following criteria as indicators of good fit: CFI>.95, RMSEA<.06 and SRMR<.08.

To determine whether a general factor can adequately represent third-wave psychotherapy MCs, we will first compare the factor loadings on the general factor in bifactor model against those on the unidimensional model. Factor similarity will be assessed using the Tucker's congruence coefficient (<.85 indicates fair similarity). Second, we will calculate the explained common variance (ECV) and the percent uncontaminated correlations. A ECV =.65 with a relative bias of <.07 is required to support the existence of a general factor. At last, we examine the coefficient omega (OmegaS), OmegaS hierarchical, and ECV for each subscale.

**Implications:** Findings will inform us the pathway through which third-wave psychotherapies work. Given questions pondering how psychotherapies work inherently entail enquiries of how PS are formed, a general MC in third-wave psychotherapies might also represent cognitive-emotional vulnerability to depressive and anxious psychopathology.

<b>Poster Presentation:</b>	PA4
<b>Name of Student:</b>	YIH, Imogen Yong Xin
<b>Name of Primary Supervisor:</b>	Professor JIN, Frances Jingwen
<b>Name of Co-supervisor</b>	Professor CHEUNG, Sing Hang

### **Elucidating the Cognitive and Computational Mechanisms of Threat-Related Perceptual Decision-Making under Top-Down Attention Modulation**

**Background:** Anxiety is characterized by aberrant processing and response to threat. This hypervigilance has been linked to cue-related biases during threat-related perceptual decision-making. A critical aspect of threatening stimuli processing is spatial frequency (SF), as different SFs indicate different information processing pathways in the brain. Recent evidence suggests individuals use high SF (HSF) as opposed to low SF (LSF) information when making emotion-related decisions. Whether anxiety is related to altered perceptual responses to threatening stimuli in different SFs and the corresponding computational mechanisms remain unknown.

**Methods:** In the present study, we ask participants to make emotion-related decisions on briefly presented hybrid face stimuli containing contrasting SF signals. The SF information can be congruent (e.g., both fearful) and incongruent (e.g., LSF fearful while HSF neutral). Across three attention conditions, participants are asked to decide whether each face is “fearful or neutral”, “fearful or not”, or “neutral or not”. Anxious arousal is measured using the Mood and Anxiety Symptom Questionnaire (MASQ) and anxious apprehension is measured using the Penn State Worry Questionnaire (PSWQ). Categorical diagnoses are collected via the Structured Clinical Interview for DSM-5 (SCID-5).

**Results:** Data collection (target N = 60) is ongoing. We will use ANCOVA and regression to examine the association between participants’ anxiety symptom dimensions and fear response of (1) LSF versus HSF information, as well as (2) drift diffusion modeling (DDM) derived computational measures.

**Conclusions:** Findings from this study will elucidate fear decision-making in relation to dimensional and categorical conceptualizations of anxiety, and inform ecologically valid models of emotion processing.

<b>Poster Presentation:</b>	PA5
<b>Name of Student:</b>	DONG, Na
<b>Name of Primary Supervisor:</b>	Professor LAM, Charlene
<b>Name of Co-supervisor:</b>	Professor LEE, Tatia Mei Chun

## **Screen Media Activities Longitudinal Impact on Brain Architectures, Mental Health and Psychopathology in Early Adolescence**

The growing consumption of screen media by adolescents has raised concerns regarding its effects on mental health development. This study aimed to examine the correlational and causal association between screen media activity (SMA) and mental health problems longitudinally and the mediating role of brain's function and structure on such a relationship.

Data were drawn from the Adolescent Brain Cognitive Development (ABCD) study, comprising baseline, 2-year, and 3-year follow-up data from 4,557 adolescents (mean age =  $9.955 \pm 0.164$  years). We performed linear mixed model to SMA correlated to mental health and brain development patterns respectively. Then, we performed cross-lagged model to SMA and mental health for longitudinal effect. A mediation model demonstrated the potential brain mechanism on the SMA-mental health longitudinal correlation.

Adolescents with higher average SMA time were significantly positively affect internalizing problems ( $\beta = .030$ ,  $SE = .012$ ,  $p_{\text{fdr}} = .016$ ), and stress problems ( $\beta = .026$ ,  $SE = .012$ ,  $p_{\text{fdr}} = .037$ ) three years later. The functional connectivity between cingulo-opercular network (CON) and retrosplenial temporal network (RTN) significantly fully mediated the externalising problem ( $\beta$  [95% CI] = 0.002 [0.001, 0.003],  $p_{\text{fdr}} = 0.042$ ) and the stress problem ( $\beta$  [95% CI] = -0.003 [-0.004, -0.002],  $p_{\text{fdr}} = 0.022$ ). Time spent on TV watching predicted more future externalizing problems ( $\beta = .077$ ,  $p_{\text{fdr}} < .001$ ), whereas time spent on video watching predicted the severity of externalising, internalising and stress problems three years later (internalizing:  $\beta = 0.066$ ,  $p_{\text{fdr}} < .001$ ; externalizing:  $\beta = .065$ ,  $p_{\text{fdr}} = .035$ ; stress problems:  $\beta = .076$ ,  $p_{\text{fdr}} < .001$ ). Video watching had the strongest association with the future changes in the RSFC of the brain, followed by texting, video chatting, game playing, and TV watching. The RSFC between the CON and RTN was found to mediate game-playing's effect on externalizing problems ( $\beta$  [95% CI] = .002 [0.001, 0.003],  $p_{\text{fdr}} = .030$ ) and stress problems ( $\beta$  [95% CI] = -.003 [-0.004, -0.002],  $p_{\text{fdr}} = .018$ ).

The findings indicate that SMA might have a negative impact on the mental health of adolescents. SMA can be a valuable indicator or predictor for assessing mental health issues in adolescents. Future research should explore the specific risks associated with video streaming and gaming, particularly in the post-COVID era, and consider the role of emerging technologies such as virtual reality in SMA.



<b>Poster Presentation:</b>	PA6
<b>Name of Student:</b>	PAN, Yue
<b>Name of Primary Supervisor:</b>	Professor LI, Shirley Xin

## **Sleep Variability and Its Association with Circadian Biomarker and Depressive Symptoms in Youths with Delayed Sleep Phase Disorder and Insomnia Disorder**

### **Introduction:**

Insomnia disorder and delayed sleep phase disorder (DSPD) share similar clinical symptoms, such as difficulty falling asleep, yet they may be linked to different pathophysiological processes. Intraindividual variability (IIV) in sleep may be an important feature to consider given its implications for mental and physical health outcomes. This case-control study aimed to compare sleep IIV in delayed sleep phase disorder, insomnia disorder, and healthy sleepers, and to examine the association of IIV with dim light melatonin onset (DLMO) time and depressive symptoms.

### **Method:**

Youth participants with DSPD (N =39, Mage=20.54±1.83, 69.2%female) and insomnia disorder (N =40, Mage=20.60±2.01, 67.5%female) diagnosed according to the ICSD-3 criteria, as well as healthy sleepers (N =40, Mage=19.53±2.25, 67.5%female) were invited to complete a set of questionnaires on sleep- and mood-related symptoms, 7-day sleep diary with actigraphy monitoring, and a one-night laboratory-based DLMO assessment. Subjective and objective IIV were calculated using root mean squared successive differences from sleep diary and actigraphy data.

### **Results:**

Compared to control group, both DSPD and insomnia groups had greater IIV in subjective and objective sleep onset latency (SOL) (both  $p < .001$ ), later DLMO time (DSPD:  $p < .001$ ; insomnia:  $p = .041$ ) and more severe depressive symptoms (DSPD:  $p < .001$ ; insomnia:  $p = .004$ ). Only the DSPD group showed greater IIV in subjective time in bed (TIB) ( $p = .042$ ) and total sleep time (TST) ( $p = .015$ ). Additionally, DSPD group showed greater IIV in subjective TIB ( $p = .009$ ), TST ( $p = .034$ ) and more severe depressive symptoms ( $p = .029$ ) compared to insomnia group. Regression analyses indicated that greater sleep IIV in both subjective ( $\beta = 0.24$ ,  $p = .014$ ) and objective SOL ( $\beta = 0.31$ ,  $p = .001$ ) were significantly associated with later DLMO time. However, only IIV in subjective SOL was associated with depressive symptoms ( $\beta = 0.20$ ,  $p = .042$ ).

### **Conclusion:**

This study showed that youths with DSPD and insomnia disorder exhibited greater sleep IIV, which was associated with later circadian time and more severe depressive symptoms. These findings may have the implications for understanding the link among sleep, circadian and mood disturbance in relation to DSPD and insomnia disorder. Further research may consider examining the intervention effects on sleep IIV in the context of DSPD and insomnia disorder.

<b>Poster Presentation:</b>	PA7
<b>Name of Student:</b>	SHEN, Ye Helen
<b>Name of Primary Supervisor:</b>	Professor LEE, Tatia Mei Chun

### **The Comprehensive Approach of Multimodal Retinal Ganglion Cell Data Analysis to Mark Aging**

Ageing has become a pressing concern that impacts the life quality of many people, as well as their mental and psychological health. Developing non-invasive methods of detecting CNS neurons at the cellular level has been a challenge until now. Retina, as an extracranial extension of the cerebral nerve and the only visualized neurovascular tissue which is easily accessible, is an ideal window for monitoring neuronal properties of the central nervous system. Specifically, retinal ganglion cells, which function as projection neurons transmitting information from other retinal neurons to the brain, are of particular interest. In the present study, we developed an integrated analytical module, in which the characteristic differences of the optical coherence tomography (OCT) thickness maps, superficial vascular plexiform images, pattern electroretinography (ERG) and multifocal electroretinography results were examined and compared between young (aged 22-32) and old (aged 45-62) groups. In terms of retinal structural parameters, the ganglion cell layer thickness and volume significantly decreased especially in the outer inferior region (\*p=0.013) for the old group. Regarding retinal vascular parameters, the vessel area density(\*p=0.003) and vessel length density(\*p=0.021) significantly decreased and the means of vessel diameter (\*p=0.008) and vessel length (\*p=0.028) significantly increased with normal aging. Furthermore, analysis of retinal functional parameters using multifocal electroretinography (ERG) results indicated that the implicit time of P1 and N1 has significantly increased in specific regions of the 103 hexagons with normal aging. The integrated analysis revealed a strong connection of the retinal structural, vascular, and functional changes. Additionally, our study provides a quantitative and integrated analytical method that elucidates the connections between these alternations at the cellular level. These insights contribute to a deeper understanding of the psychopathological processes underlying neurodegenerative disorders and the mechanisms of central nervous system aging.

<b>Poster Presentation:</b>	PA8
<b>Name of Student:</b>	WONG, Mei Sze
<b>Name of Primary Supervisor:</b>	Professor WONG, Tin Yau Terry

## **The Roles of Spatial Ability and Visuospatial Working Memory Capacity on Cognitive Mapping Performance**

Cognitive mapping is a fundamental mental process that allows individuals to create a mental representation of their environment, enabling them to navigate through it effectively. In the context of our study, the focus is on investigating the distinct contributions of four spatial abilities - intrinsic-static, intrinsic-dynamic, extrinsic-static, and extrinsic-dynamic skills, as outlined in Uttal et al.'s (2013) 2 x 2 typology, to the performance of cognitive mapping tasks. Understanding how these different spatial abilities impact cognitive mapping can offer insights into the underlying mechanisms involved in spatial cognition.

Moreover, our study aims to explore the potential moderating role of visuospatial working memory (VSWM) in influencing the relationship between spatial abilities and cognitive mapping performance. Visuospatial working memory plays a crucial role in temporarily storing and manipulating visual and spatial information, which could significantly impact an individual's ability to create and utilize cognitive maps effectively. By investigating the interplay between spatial abilities and visuospatial working memory, our study seeks to shed light on how cognitive mapping skills may be influenced by cognitive processes related to memory and attention.

A sample of 200 participants spanning a wide age range from 18 to 60 will undergo a series of assessments. These assessments will include tasks such as Embedded Figures, Mental Rotation, Spatial Scaling, Spatial Perspective Taking, Corsi Backward Span. Additionally, cognitive mapping performance will be evaluated through tasks such as Landmark Placement, Route Direction, and Shortcut-Finding tasks, following the three-level acquisition of cognitive mapping proposed by Siegel and White (1975). These assessments aim to provide a comprehensive evaluation of participants' cognitive mapping skills.

The accuracy of cognitive mapping performance will be validated using the Santa Barbara Sense of Direction Scale (SBSOD), a widely accepted self-assessment tool. The SBSOD measures an individual's subjective evaluation of their own sense of direction and is recognized as a standardized and reliable instrument in spatial cognition research. By examining the relationship between cognitive mapping skills and subjective sense of direction using the SBSOD, our study aims to enhance the credibility and validity of the cognitive mapping assessment.

Moreover, our study will control for factors such as fluid intelligence and verbal working memory (VWM) using Raven's Advanced Progressive Matrices and Digit Span Backward. By accounting for these variables, our study can better understand the unique roles of different cognitive processes in shaping individuals' navigation abilities.

<b>Poster Presentation:</b>	PA9
<b>Name of Student:</b>	MU, Zexuan
<b>Name of Primary Supervisor:</b>	Professor HU, Xiaoqing

### **Event Boundaries in Memory Formation and Retrieval of Naturalistic Experience: A Neurophysiological and Behavioural Perspective**

While experience is continuous, memories are organized as discrete events. The segmentation of experience and its structuring into memory via cognitive boundaries remains unclear. The current study aimed to elucidate how individuals encode complex naturalistic stimuli and the effects of this encoding on short-term and long-term memory retention. Employing a repeated measures design, we examined the impact of three types of event boundaries—no boundary, soft boundary, and hard boundary—on memory retention at two intervals: immediately and seven days post-exposure. Fifty-two participants aged 18 to 30 viewed movie clips and were asked to recall these clips at both intervals.

Electroencephalogram (EEG) analysis was utilized to monitor brain activity during the encoding and recall phases. The results indicated a significant modulation of brain wave patterns by event boundaries, with increases observed in delta, theta, beta, and gamma power. Notably, theta power exhibited a positive correlation with the integration of memory across boundaries, suggesting that theta rhythms may facilitate the linking of episodic information when demarcated by soft or hard boundaries. Conversely, beta power appeared to be associated with the dissociation of memories across these boundaries, indicating a potential role in segmenting experiences into discrete events that are independently retrievable. Delta waves were generally linked to the overall memory performance on naturalistic stimuli, reflecting perhaps a foundational role in sustaining neural activity conducive to memory encoding and retrieval.

These findings underscore the essential function of event boundaries in memory formation and retrieval. It suggested that different neural mechanisms, as reflected in distinct EEG frequency bands, may be related to either integrate or segment human memory depending on the type of boundary encountered. This study provides crucial evidence for understanding how naturalistic experiences are processed and remembered, contributing to the broader discourse on memory management in realistic settings.

<b>Poster Presentation:</b>	PA10
<b>Name of Student:</b>	LIANG, Li
<b>Name of Primary Supervisor:</b>	Professor LEE, Tatia Mei Chun

### **Predicting Recovery from Acute Stress Through a Resilience Index Developed by Integrating Multiple Physiological Responses to The Trier Social Stress Test**

Previous theoretical and empirical research has highlighted the predictive utility of different physiological reactivities and recovery patterns from acute stress for long-term mental health outcomes. Integrating these multiple temporal responses to delineate the adaptive and dynamic resilient processes and then generating a resilience index would be significant for the timely identification of the risk of mental health vulnerability. This study investigated whether and how psychological resilience was manifested as a function of adaptive acute stress responses. A resilience index was constructed through integrating multiple physiological responses of 108 participants' acute stress induced by the Trier Social Stress Test. Participants were categorized into high- and low-resilience groups based on their levels of resilience index. We found that the association between daily stressors and psychiatric symptoms was significant among participants of low-resilience group but not significant in high-resilience group, indicating that the resilience index could distinguish individuals with better stress adaptation. To better understand the protective and risk factors of resilient physiological responses, we further exploited a wide array of predictors (N = 51) from physiological, emotion, behavioral, and demographic domains, and utilized least absolute shrinkage and selection (LASSO) logistic regression to select important predictors for resilient physiological responses. The prediction model showed good predictive accuracy (AUC = 0.85, accuracy = 75.9%, sensitivity = 74.1%, specificity = 77.8%). Among the 51 predictors, seven were identified as critical ones, including baseline physiological activity, age, minor medical conditions, cognitive interference inhibition, positive affective style, adaptive coping strategies, and emotional sensitivity (absolute magnitude of coefficients = 0.075-0.714). These findings highlighted the importance of considering stress reactivity and recovery and physiological stress responses to understand the resilience process. These findings offer significant insight into developing wearable cognitive behavioral adjustment protocols to promote recovery from stress and hence mental well-being.

<b>Poster Presentation:</b>	PB1
<b>Name of Student:</b>	HONG, Jun Kerina
<b>Name of Primary Supervisor:</b>	Professor SHUM, Kar Man Kathy

**Parents' Emotional Regulatory Flexibility and Children's Psychological Resilience:  
Longitudinal Mediation through Children's Emotional Regulatory Flexibility in Two  
Cultures and the Context of Autism**

Emotion dysregulation in response to life changes is a common difficulty for children with autism spectrum disorder (ASD) and can further lead to maladaptation in various aspects, underscoring the need to explore ways to enhance their flexibility and psychological resilience amidst potential traumatic events. This study aims to (1) examine the cross-sectional and longitudinal correlations among parental emotion regulation (ER) flexibility, children's ER flexibility, and children's resilience; and (2) investigate how these relationships differ between families with neurotypical (NT) children and those with autistic children across Chinese and Western cultures.

The study plans to recruit four groups of parent-child dyads based on neurological conditions (i.e., ASD vs. NT) of children and cultural backgrounds (i.e., Western vs. Chinese), with 100 dyads in each group. Children aged 10-15 years old will be recruited. Online ecological momentary assessment (EMA) will be implemented to capture parents' and children's daily emotional events, situational characteristics, initial and changed use of ER strategies, as well as children's daily resilience indicators. The longitudinal data collection will occur in three phases, each lasting 21 days, with a time interval of 6 months between each phase. Correlations and mediation relationships will be analysed using multilevel mediation models using RStudio.

It is hypothesized that (1) ASD children will exhibit lower levels of ER flexibility and psychological resilience compared to NT children in both cultures; (2) children's ER flexibility will mediate the relationships between parents' ER flexibility and children's psychological resilience across all groups; and (3) there will be no significant difference in participants' ER flexibility between the two cultures, but there will be variations in the habitual use of ER strategies.

This research is expected to provide insights into the patterns and flexibility of ER strategy use in children with and without autism, offering perspectives on how to improve the psychological resilience of children from diverse backgrounds. (308 words)

<b>Poster Presentation:</b>	PB2
<b>Name of Student:</b>	SONG, Xiaoqi Vicky
<b>Name of Primary Supervisor:</b>	Professor LEE, Tatia Mei Chun

### **Lower Functional Connectivity State Transitions During Affective Processing Correlate with Subsequent Impairment in Sustaining Positive Affect in Subthreshold Depression**

**Background:** Diminished capacity for maintaining positive affect (PA) has been identified in subthreshold depression (StD). While recent studies have explored affective dynamics among individuals with StD, the relationship between early emotional processing impairments and the capacity to prolong PA remains uncertain. Furthermore, it is also unclear how brain connectivity patterns observed in StD are associated with aberrant PA maintenance.

**Methods:** The experimental procedure comprised a baseline resting-state functional magnetic resonance imaging (rs-fMRI) scan, followed by a PA-inducing movie viewing task during scanning, and three further rs-fMRI sessions. Participants provided PA ratings following each session. PA maintenance was quantified through the slope of mood change between each rs-fMRI session after movie viewing. We performed a dynamic functional connectivity analysis (dFC) on movie viewing data, as well as a series of static functional connectivity (FC), analyses on data of all rs-fMRI sessions from 25 StD and 25 healthy controls (HC). Correlations between dFC and static connectivity measures and the slope of mood change were then calculated.

**Results:** Individuals with StD exhibited reduced capacity in sustaining PA compared to HC, reflected in a decrease in PA in the early maintenance stage. StD also had a lower number of transitions between four brain states during movie viewing, which was related to subsequent impairment in sustaining PA. In addition, StD had weaker static FC between left inferior frontal gyrus and right middle occipital gyrus during the first resting-state session following movie viewing, which in turn was related to a steeper decline in PA.

**Conclusions:** This study demonstrates impairments in sustaining PA are related to both brain dynamics observed during positive movie viewing as well as aberrant static FC. These results highlight the brain features driving PA dysregulation in StD and provide a potential avenue for the development of future interventions.

<b>Poster Presentation:</b>	PB3
<b>Name of Student:</b>	TAN, Joo Wee
<b>Name of Primary Supervisor:</b>	Professor CHEUNG, Sing Hang

## **Meta-Analytic Structural Equation Modelling (MASEM) in the Cognitive Framework of Working Memory and Fluid Intelligence: Does Attention or Speed Matter?**

Working memory (WM) is associated with various cognitive functions. It becomes a window for information processing related to prior memory (Shipstead et al., 2014). The limited capacity of WM influences how we successfully retain goal-oriented information during learning (Cowan, 2014). With its well-established association with higher-order processing, such as in fluid intelligence, more explanations of this relationship attributing to the capacity of WM and the interaction of other cognitive constructs should be extended (Burgoyne et al., 2019; Hageman et al., 2023). To inform us more about the interactive nature of the WM system, it is worthwhile to explore whether the variations in cognitive abilities are due to individual differences or purely due to universal cognitive constraints from a robust set of data. Therefore, the current study examines the relationship of WM along with other cognitive domains including fluid intelligence, attention control and processing speed using a meta-analytical approach.

The study includes two parts. The first research question concerns to what extent attention control and processing speed relate to WM capacity and fluid intelligence respectively. The second research question focuses on the mediating role of attention control and processing speed on the relationship of WM and fluid intelligence. Overall, we aim to investigate how the other cognitive processes impact the individual differences established in the WM-Gf relationship.

Extracting the database searches from PsycInfo, PubMed and Web of Science with publication records from year 2001 to 2024, we include 2898 publications using the search terms of the four constructs at the initial stage. We further obtain unpublished data through ProQuest Dissertations & Theses Global by restricting to abstracts only. After removing duplicates and ineligible studies in the abstract screening, two reviewers screen all full-text papers according to the inclusion criteria and extract the reported correlations.

In the analysis, we adopt the two-stage structural equation modelling (TSSEM; Cheung & Chan, 2005) in our meta-analytic structural equation modelling (MASEM) using the {metaSEM} R package. To answer the first relational question among the variables, we calculate a pooled multivariate correlation matrix while controlling for potential age and gender effects. For the second mediation question, we apply the second stage of TSSEM by fitting the SEM to the pooled correlation from the first stage, using the weighted least squares (WLS) estimation in the weight matrix. As this is an ongoing study, the results are yet to be reported at the later stage of the study.

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<b>Poster Presentation:</b>	PB4
<b>Name of Student:</b>	CHEN, Si Catherine
<b>Name of Primary Supervisor:</b>	Professor CHENG, Cecilia

### **Conceptualization of Digital Well-being**

The construct of digital well-being (DWB) has emerged as a critical area of concern in the digital era, where technology permeates nearly every aspect of human life. Current research on DWB employs two distinct conceptual approaches. The first approach frames DWB as the counterpart to digital ill-being, drawing parallels to frameworks of digital addiction, and the second approach to conceptualizing DWB is grounded in subjective well-being frameworks, emphasizing the hedonic and eudaimonic benefits that arise from digital usage. The present study aims to acknowledge the complex nature of the construct by examining the relationships among the affective, social, and cognitive dimensions of DWB, as well as the associations between DWB factors and a cluster of DWB protective and risk factors. The present study employed a cross-sectional design to collect data using survey questionnaires administered through Qualtrics software. A total of 578 participants were recruited from the Prolific Academic platform. All eligible participants underwent the same procedures for survey completion. The data was analyzed using regularized GGM, which resulted in two networks with the first one addressing the cognitive, affective, and social dimensions of DWB and the second one mapping out the associations between DWB and related factors. The results emphasized the complexity of DWB by introducing a system-based conceptual framework that highlights the interplay between cognitive, affective, and social dimensions of DWB. Demographic findings suggested that younger individuals face greater risks of problematic online behaviors, and gender differences in digital literacy and nomophobia indicate potential obstacles and health risks associated with digital usage. The conceptual network findings on various DWB factors suggest that digital stress and hedonic well-being are independent constructs of the affective dimension of DWB. Consistent with subjective well-being and psychological well-being literature, the most central aspect of optimal DWB concerns fulfilling individuals' psychological needs for competence and autonomy through digital eudaimonic benefits. The hedonic experience, on the other hand, was closely related to the social dimension of DWB. The network results of DWB and its related factors showed that emotional regulation and effective coping strategies are key in distinguishing between digital competency and dependency, emphasizing the role of emotional regulation and cognitive control in fostering positive digital experiences. These insights highlight the importance of promoting autonomous and skilled digital use across demographics to ensure healthier digital engagement.

<b>Poster Presentation:</b>	PB5
<b>Name of Student:</b>	WONG, Yee Lok
<b>Name of Primary Supervisor:</b>	Professor LI, Shirley Xin

## **The Association between Impulsivity and Anxiety in Adolescents with Insomnia: The Moderating Role of Evening Chronotype**

**Introduction:** Adolescence is a unique stage of cognitive, psychosocial and physical growth and development. This period is often associated with increased evening tendency, as well as increased risks for mental health and sleep problems. Insomnia is amongst the most common sleep problem in youths and is commonly associated with impulsivity and anxiety symptoms. Previous research suggested the comorbidity of insomnia and eveningness as a significant risk factor for anxiety symptoms in adolescents. Meanwhile, there has been some evidence suggesting that insomnia and eveningness are respectively associated with impulsivity. Nonetheless, the relationships among eveningness, impulsivity and anxiety in the context of insomnia remained unclear.

**Objectives:** To investigate how circadian preference moderates the association between impulsivity and anxiety symptoms in adolescents with insomnia.

**Methods:** Adolescents aged 12-20 years old diagnosed of DSM-V insomnia disorder were recruited. They completed self-reported questionnaires, including the Morningness-Eveningness Questionnaire (MEQ) for assessing circadian preferences, Insomnia severity indexes (ISI) for assessing insomnia symptoms, the General Anxiety Disorder (GAD) scale to measure anxiety symptoms, and the Barret Impulsiveness Scale (BIS) for assessing impulsivity. Participants completed an objective cognitive task (the Balloon Analog Risk Task, BART) to measure risk-taking behavior. Their sleep was objectively assessed by 7-day actigraphy.

**Results:** Eighty-eight participants were recruited into this study (age:  $18.20 \pm 1.61$  years). Among them, 44% of the participants were identified as eveningness type (MEQ < 42). There were no significant differences in anxiety symptoms and impulsivity based on both self-reported and behavioral task between circadian preferences (*all p* > .05). Circadian preferences was found to significantly moderate the association between self-reported impulsivity and anxiety symptoms after controlling age and sex factor (*p* = .009) but not the association between risk-taking behavior and anxiety symptoms (*p* > .05). Specifically, higher self-reported impulsivity was associated with more severe anxiety symptoms in adolescents with insomnia and eveningness (*p* = .006). No significant association was found between self-reported impulsivity and anxiety symptoms in non-eveningness group (*p* > .05).

**Conclusion:** The findings suggested the role of circadian preference in moderating the association between impulsivity and anxiety symptoms in adolescents with insomnia. Further research may explore different aspects of impulsivity and examine the causation between eveningness, insomnia, impulsivity and anxiety among adolescents in a longitudinal design.

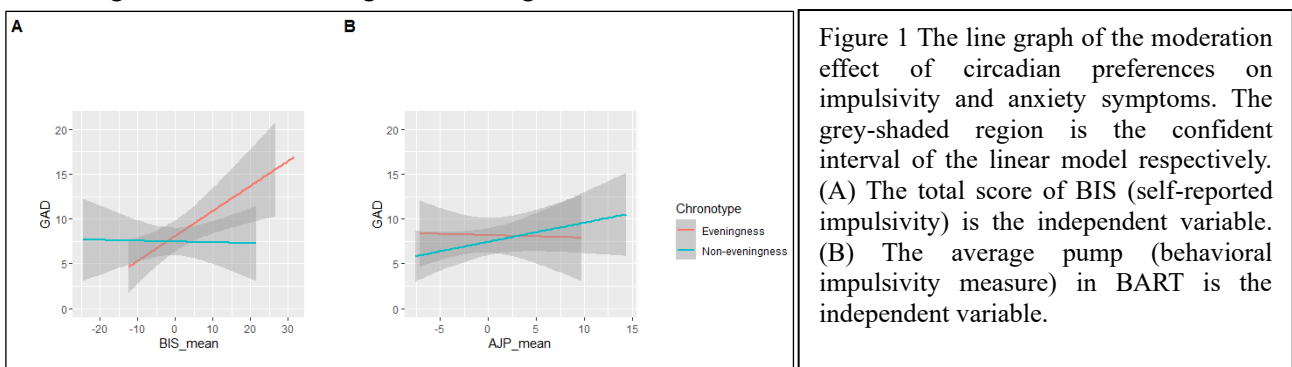


Figure 1 The line graph of the moderation effect of circadian preferences on impulsivity and anxiety symptoms. The grey-shaded region is the confident interval of the linear model respectively. (A) The total score of BIS (self-reported impulsivity) is the independent variable. (B) The average pump (behavioral impulsivity measure) in BART is the independent variable.

<b>Poster Presentation:</b>	PB6
<b>Name of Student:</b>	WU, Yu
<b>Name of Primary Supervisor:</b>	Professor BECKER, Benjamin

### **Hierarchical Structure and Brain Mechanisms of Humans' Reward Experiences**

Reward plays a fundamental role in human survival and welfare. New-born babies have innate inclination to gain sensory rewards by consuming food rich in sugar such as breast milk and approaching warm objects. As people grow up, social reward from positive interactions with closed ones becomes more salient for one's well-being. By using MRI and machine learning techniques, this study aims to explore the brain mechanisms of sensory and social rewards and develop SVM classifiers to test whether social reward experiences such as romantic love and friendship are rooted in sensory reward experiences. This study also investigates how social reward experiences extend from real life to the digital world, by determining shared and distinct brain mechanisms underlying social rewards in real life and on social media. This study is expected to bring new insights into humans' reward experiences evolve in a putative hierarchical structure and explain why social reward gained on social media tend to be addictive.

**Keywords:** reward, fMRI, machine learning, social media.

<b>Poster Presentation:</b>	PB7
<b>Name of Student:</b>	JIN, Yujing Fiona
<b>Name of Primary Supervisor:</b>	Professor LI, Shirley Xin

## **Reward Processing and Eveningness in Youth Depression**

### **Introduction:**

Adolescence is marked by biological and psychosocial changes which increase one's vulnerability to mental disorders such as depression. Meanwhile, another change during this period is the increased preference for eveningness, which was also found to be associated with a higher risk of mental disorders, including depression and insomnia. Despite this, the mechanisms linking eveningness to these conditions remain unclear, hindering effective intervention development. Impaired emotional regulation and altered reward processing has been proposed to underly the relationship between circadian disruptions to mental illnesses. Specifically, aberrant reward processing, linked to depression-related anhedonia, is a key focus. Evidence suggests that eveningness correlates with altered reward responses where individuals with eveningness show diminished attention to happy faces, indicating unique reward processing alterations. The proposed study aims to further clarify the mechanisms linking eveningness and mood disturbances. It is hypothesized that impaired reward processing mediate the relationship between eveningness chronotype and future depression symptoms. In addition, the eveningness group will show greater aberrant reward processing (i.e., more blunted reward sensitivity) than the healthy control group at baseline.

### **Methods:**

This is a longitudinal study with one-year prospective follow-up. Two groups of participants aged 12 to 20 will be recruited: adolescents with evening chronotype (N = 87, as defined by morningness-eveningness questionnaire (MEQ) less than 42) and healthy normal controls (N = 87, non-eveningness, MEQ  $\geq$  42). Participants will first undergo a clinical interview to screen for sleep and mental disorders. Depressive symptoms will be assessed by the Children's Depression Rating Scale-Revised (CDRS). Eligible participants will be also invited to complete self-reported questionnaires to assess sleep, mood and reward processing. Sleep will be objectively assessed through polysomnography (PSG). dim light melatonin onset (DLMO), sleep diary, and Actiwatch will be used to measure circadian rhythm. Reward processing will be evaluated using EEG tasks, Monetary Incentive Delay (MID), and Door Guessing (DG) tasks, plus a self-report questionnaire. All the recruited participants will be invited to complete one-year follow-up assessment using the same measures as baseline.

### **Expected outcomes and implication:**

The outcomes of this study include group differences in event-related potentials (ERP), questionnaire scores, and in sleep metrics. This study aims to enhance understanding of reward processing's role in linking eveningness and depression, potentially guiding targeted interventions for adolescents with an eveningness chronotype.

<b>Poster Presentation:</b>	PB8
<b>Name of Student:</b>	ZHANG, Qi Kate
<b>Name of Primary Supervisor:</b>	Professor CHAN, Wai Sze

### **Trajectories of Sleep and Depressive Symptoms in Chinese Women from Late Pregnancy to the Early Postpartum Period: a Longitudinal Cohort Study**

The relationship between sleep and depressive symptoms during the perinatal period has received substantial research interest due to its impact on maternal and infant health. However, there are still potential gaps in the existing research, particularly regarding the longitudinal dynamics of these conditions and their cultural contextualization within the Chinese population. Therefore, the current study utilized semi-parametric group-based trajectory modeling to identify different sleep and depression trajectories in a group of women (N=172) in Hong Kong and examined the factors influencing the trajectories of sleep and depressive symptoms from late pregnancy to the early postpartum period. Our results suggested distinct patterns of perinatal sleep quality and changes in depressive symptoms from late pregnancy to early postpartum. A cubic three-class model was identified as the best fitting model of changes in sleep quality over time, while a two-class model was identified as the best fitting model of changes in depressive symptoms during perinatal period over three time points. In the "stable good" sleep trajectory group (class 1), 52.2% were also in the "low-risk" depression trajectory group. The "stable mild" sleep group (class 2) had a nearly even split, with 45.5% in the "low-risk" depression group and 54.5% in the "high-risk" group. It is important to note that the majority of participants in the "increasing poor" sleep trajectory group (class 3) were also in the group with the highest risk of depression. Several factors that play significant roles in predicting group memberships of sleep and depressive trajectories were identified, highlighting the need for further investigation into the roles of rumination, pre-sleep arousal, emotion regulation, and social support in relation to sleep and depression. This study also provides new insights into how cultural and social factors uniquely influence sleep and depressive symptoms among Chinese women who follow the traditional Chinese practice of "doing the month." The results highlight that extensive social support may not adequately address the specific needs of mothers and may even worsen their sleep quality and mood. Future studies should focus on developing culturally tailored interventions that integrate traditional Chinese postpartum care with modern psychological and medical approaches to provide timely and culturally appropriate support for local mothers in need.

<b>Poster Presentation:</b>	PB9
<b>Name of Student:</b>	ZHANG, Yinghao Lexi
<b>Name of Primary Supervisor:</b>	Professor JIN, Frances Jingwen

### **Active Inference Modelling Delineates Interpersonal-Coordination Patterns Across Different Symptom Dimensions of Schizophrenia**

Social functioning impairment, particularly deficits in dynamic coordination, is prevalent in patients with schizophrenia. However, it remains unclear how the aberrant coordination patterns are mapped onto different symptom profiles and what cognitive and computational mechanisms are behind this mapping. Here we employed a joint finger tapping task and asked participants to tap their fingers following an auditory rhythm and in synchrony with their partner. Four groups of participants were tested: two representing classic dimensions of negative symptoms, predominant withdrawal (WD) and predominant blunted affect (BA), one marked by evident positive symptoms (PS), and one healthy control group (CT). We measured within-participant tapping consistency (variance of inter-tap interval) and interpersonal consistency (synchronisation with the partner) and modelled the participants' cognitive-behavioural process using active inference. Results showed distinct behavioural patterns for the four groups, with the CT group demonstrating the highest interpersonal consistency, followed by the PS group, the BA group, and lastly by the WD group. WD group showed the highest within-participant consistency while the BA group tended to tap randomly. These differential behavioural patterns were well-captured by our models, establishing the face validity of using active inference to mechanistically quantify the interpersonal coordination processes. Model parameters revealed that the compromised likelihood mapping between participants' inferred hidden states and interactional outcomes contributed to the observed aberrant coordination patterns the most, suggesting the importance of sensory attenuation in schizophrenia. Our work demonstrates the association between differential aberrant coordination patterns and different dimensions of psychopathology and provide an avenue for revealing the cognitive mechanisms of interpersonal-coordination impairments in schizophrenia.