

Presentation and Poster Abstracts*

Poster

Investigating fundamental frequency in children's speech: Language diversity and adaptation to miscommunication

Esmee Aalders, UZH (Advisors: Moritz Daum, Stephanie Wermelinger)

This study investigates how children's speech is affected by language-specific characteristics, how these characteristics differ between children who speak one or more languages, and how these characteristics are related to the reparation of misunderstandings. Further, we focus on how children use fundamental frequency and interjections in speech as tools to repair misunderstandings. Variability in children's communicative environments, such as the interaction partners and spoken languages, significantly shapes their communicative behaviour. Bilingualism in children, which inherently increases this variability, is associated with greater use of non-verbal means for communication, greater flexibility in using different means to communicate, a stronger ability to adapt their speech to listeners, and a greater likelihood of repairing communication breakdowns. While previous research explored these adaptive behaviours in bilingual children, the specific roles of speech elements like fundamental frequency (perceived pitch) and interjections (e.g., "Aha!" and "Oh!") - which serve to express emotions, arousal, and attract attention - remain underexplored. To address this gap, this study will examine language-specific differences in fundamental frequency among monolingual and bilingual children in natural non-interactive speech during a picture-description task. Further, the study is focusing on how children adapt their speech following misunderstandings, during natural interaction with the experimenter in which children describe the location of known and novel objects on a shelf. This poster outlines the research design and methodology, detailing how data will be collected and analysed to investigate these questions. The findings will offer insights into the role of speech in communicative development, particularly in how children repair communication breakdowns.

Presentation

Moral judgments of concealers of infectious illness

Savannah Adams, UM (Advisor: Joshua Ackerman)

Current concealment literature focuses on how people may conceal identity-relevant features (e.g., sexual orientation) to avoid moral judgments and stigma, but recent research demonstrates people also conceal non-identity-relevant features, such as infectious illness. We investigated this unique concealment context by conducting multiple studies where participants read scenarios describing targets as concealing symptoms of infectious illness in various situations. Moral judgments of concealers differed across situations such that participants associated higher moral character with targets who concealed illness symptoms for reasons that were also considered less selfish (e.g., to go to an exam, to work, or to a meeting), in contrast to those who concealed in situations perceived as more selfish (e.g., going to a social event or haircut). Participants also associated differing levels of harm with concealing within these situations along a similar pattern. These findings held regardless of how severe the symptoms being concealed were. This research suggests that there may be something

*In alphabetical order by author!

more than the act of concealment alone driving the moral judgment of a concealer of infectious illness.

Poster

High-definition transcranial direct current stimulation effects on functional magnetic resonance spectroscopy

Harini Babu, UM (Advisor: Patricia Reuter-Lorenz)

Previous research has demonstrated that transcranial direct current stimulation (tDCS) is a promising, non-invasive intervention for Alzheimer's disease and related dementias (ADRD). tDCS modulates cortical excitability of underlying brain regions via primary effects on excitatory neurotransmitters such as glutamate (Glu). Neuroimaging studies have reported varying levels of Glu and amyloid β production in ADRD. Furthermore, technological advances in proton functional MR spectroscopy (H fMRS) have enabled in vivo tracking of Glu levels during task performance, therefore revealing the critical role of Glu in learning and memory. However, the link between Glu levels and brain activity and how tDCS influences this relationship within an aging population is unknown. Here, we tested healthy older adults on an ecologically relevant association memory task to examine if high-definition tDCS (HD-tDCS) influences the dynamics of Glu during task performance. To compare the effects of stimulation, we conducted a double-blind study in which participants completed the object-location association task (OLA) twice (pre and post-stimulation) in the scanner. In addition, we collected fNIRS resting state activity in parallel with active or sham HD-tDCS where participants underwent 8 minutes of baseline and 20 minutes of stimulation. Our montage targeted the left LPFC region as it was previously established to be engaged during the OLA paradigm. Preliminary H fMRS results suggest a greater concentration of Glu after active compared to sham stimulation. In addition, correlations between Glu and the electrical field at the brain level indicate that a stronger electrical field during stimulation was associated with higher Glu concentrations.

Keywords: Cognitive Aging, HD-tDCS, fMRS, tDCS

Poster

The intergenerational effects of family conflict and psychological control: Evidence from two distinct cohorts

Natasha Bailey, UVA (Advisor: Joseph Allen)

Family conflict (e.g., arguments, threats) and parental psychological control (e.g., guilt inducement, withdrawal of love) are associated with a variety of negative outcomes for adolescents, such as greater emotional reactivity and less emotional security. As a result, adolescents may be poorly equipped to meet the emotional and behavioral needs of their children if they become parents themselves. Using two independent and demographically distinct cohorts, the current two-study investigation examined how family conflict and psychological control in the family-of-origin predicted two different problematic parenting outcomes in the next generation. Both studies drew from longitudinal, three-generation samples, with data on adolescents (Study 1/2 N's: 184/266), their parents (N's 184/193), and the children of adolescents who later became parents (N's 126/385). In both studies, teens and parents reported on their family conflict

and maternal and paternal psychological control during adolescence. In Study 1, adolescents who became parents reported on their unsupportive responses to the third-generation's negative emotions (e.g., "I tell my child to quit overreacting and being a baby"). In Study 2, third-generation children reported on their parents' inconsistent discipline (e.g., "My parent frequently changed the rules I was supposed to follow"). Linear regression results from both studies revealed links between family conflict and parental psychological control to unsupportive and inconsistent parenting behaviors in the next generation. These findings support the theory that experiencing family conflict and psychological control in the family-of-origin during adolescence may reduce teens' ability to effectively respond to the emotions and behaviors of their future children.

Poster

Second-generation epigenetic clocks predict midlife cognitive status: Findings from the Louisville twin study

Sophie Bell, UVA (Advisor: Eric Turkheimer)

DNA methylation age (DNAmAge), or 'epigenetic clocks', surpass chronological age in their ability to predict age-related morbidities and mortality. This study utilized data from 287 middle-aged twins in the Louisville Twin Study, including 60 monozygotic and 41 dizygotic complete twin pairs (mean age 51.9 years \pm 7.03). We investigated the effect of DNAmAge acceleration on change in cognition between childhood and midlife, while testing early-life socioeconomic status (SES) as a moderator of the relationship. DNAmAge was estimated with five commonly used epigenetic clock algorithms. A factor analysis of the five clocks produced a two-factor structure which we identified as first generation and second generation clocks. Genetically informed, quasi-causal regression models were fitted in which adult IQ was predicted from childhood IQ, DNAmAge, and the interaction between DNAmAge and SES. Accelerated second generation DNAmAge predicted more negative change in IQ from childhood to midlife ($b = -0.18$, $SE=0.07$, $p < .05$), after accounting for genetic and environmental confounds shared by identical twins. There was an interaction such that the effect of second generation DNAmAge on IQ change was greater in twins raised in low SES households ($b = 0.07$, $SE=0.03$, $p < .05$). Second generation DNAmAge measures trained to estimate phenotypic biological age show promise in their predictive value for cognitive decline in midlife. Moreover, the longitudinal twin design of the LTS serves as a quasi-experimental framework to investigate hypothesized causal effects of DNAmAge on cognitive aging. Finally, these results suggest that the epigenome is a potential pathway through which early-life stressors become biologically embedded, impacting midlife aging outcomes.

Poster

Characterizing unique profiles and contextual correlates of multi-domain resilience to neighborhood disadvantage in youth: A person-centered and genetically-informed approach

Jessica Bezek, UM (Advisor: Luke W. Hyde)

Resilience is a dynamic process defined as positive adaptation in the face of adversity. Growing research suggests that resilience to adversity is characterized by both the absence of negative outcomes (e.g., psychopathology) and the presence of positive

functioning (e.g., satisfaction with life) across multiple behavioral domains, such as psychological well-being, social competency, and academic achievement. However, very few studies have harnessed person-centered methods to characterize individual profiles of resilience in youth across different behavioral domains, and no studies to date have characterized individual profiles of resilience during adolescence. Further, limited research has employed genetically informed designs to explore the environmental vs. genetic origins of distinct domains of resilience. The current study utilized latent profile analysis (LPA) to extract profiles of resilience across the domains of psychiatric, social, and academic functioning in a sample of 704 adolescent twins exposed to neighborhood disadvantage – a pervasive form of early life adversity. Follow-up analyses utilizing the Bolck, Croon, and Hagenaars (BCH) 3-step method were conducted to explore associations between profile membership and parenting, peer, and neighborhood social processes. Lastly, co-twin control analyses were conducted to explore whether associations between resilience profile membership and social processes were more environmental or genetic in origin. Analyses revealed that youth fell into three distinct resilience profiles: 1) High Multi-domain Resilience (63%), 2) Low Psychological Resilience, High Social Resilience (19%), and 3) Low Multi-domain Resilience (18%). Profiles differed in experiences of parenting (i.e., parental involvement and conflict), peer characteristics (i.e., friend drug-related behaviors and popularity), and neighborhood processes (i.e., social cohesion, informal social control, and positive social norms). Lastly, co-twin control analyses within monozygotic and dizygotic twin pairs revealed that the association between parenting and resilience profile membership was primarily environmentally mediated. The current analysis provides a data-driven approach toward refining our understanding of resilience profiles in youth and highlights an environmental mediation in the association between resilience and parenting that may offer a key modifiable pathway for boosting resilience in adolescents exposed to neighborhood disadvantage.

Presentation

Value-based remembering across adulthood: A multi-day field study

Jasmin Brummer, UZH (Advisors: Alexandra M. Freund, Sebastian S. Horn)

Across adulthood, motivational orientation tends to shift from prioritizing gains to prioritizing the prevention of losses. This motivational shift also affects cognition, including declarative memory. In the present research, we investigated value-directed remembering for gain- or loss-related information in a sample of younger (18-30 years), middle-aged (31-59), and older adults (60 – 85) across 9 days, using daily smartphone-based questionnaires. Our preliminary findings suggest that age and framing (gain vs. loss) affect recall performance and value-based prioritization of information. Investigating memory outside the laboratory helps to understand every-day memory processes across adulthood.

Keywords: Cognitive Aging, Motivated Cognition, Prospective Memory, Episodic Memory, Value-Directed Remembering

Presentation

Spatial navigation and memory in preschool to high school age

Lydia Brundisch, MPI for Human Development (Advisor: Markus Werkle-Bergner)

The maturation of spatially tuned cells in the hippocampus has been reliably linked to the development of superior navigational strategies and spatial memory in rodent models. However, evidence for a corresponding maturation process in humans lags behind due to methodological limitations. So far, we adapted a virtual 3-D spatial navigation task for children and adolescents and conducted a behavioral pilot study. I will present its results on common measures of spatial accuracy, bias towards cue locations, precision, internal consistency, and search strategy as well as potential confounds as functions of age in two cross-sectional samples. I will then outline a roadmap of how to bring the task into the MR scanner to obtain data on the volumes of the hippocampal subfields and the direction- and speed-dependent modulation of the BOLD (blood oxygen level dependent) signal in the entorhinal ROI (region of interest).

Poster

AD related plasma biomarkers and five dimensions of the shrinking brain

Jasmine Cooper, UM (Advisors: Patricia Reuter-Lorenz, Toni Antonucci)

Brain atrophy is a sign of neuropathological aging, and it is associated with multiple neurodegenerative disorders, including Alzheimer's disease, Schizophrenia, Parkinson's disease, and Multiple Sclerosis. Additionally, Alzheimer's Disease (AD) related plasma biomarkers can be used as a proxy to measure neurodegeneration and assess AD related changes. To better understand the link between trajectories of brain atrophy and accumulation of AD plasma biomarkers, we used a sample of 639 participants from the Baltimore Longitudinal Study of Aging who at baseline, were cognitively normal, and had both MRI scans and plasma biomarkers. We generated five scores for different trajectories of brain atrophy, based on the Surreal-GAN framework, a deep learning approach that explores variations in brain aging. AD plasma biomarkers of interest included GFAP, Ptau-181, NfL, and Amyloid-Beta ratio ($A\beta_{42}/A\beta_{40}$). After running linear mixed effects models, we found that higher baseline levels of GFAP were associated with a faster rate of atrophy in earlier changing medial temporal regions, which corresponds to the transition from being cognitively normal to showing signs of Mild Cognitive Impairment. Next, we found that higher GFAP, lower $A\beta_{42}/A\beta_{40}$, and higher ptau181 were associated with faster rate of parietotemporal atrophy, which corresponds to the transition from Mild Cognitive Impairment to Alzheimer's Disease. Importantly, we found an age modifying effect of Ptau-181 on parietal temporal atrophy, where those who showed signs of Ptau-181 accumulation earlier in older adulthood showed more advanced disease progression than their older counterparts. These results have implications for using AD plasma biomarkers for predicting and monitoring specific patterns of brain atrophy.

Presentation

Educational contextual factors on developmental trajectories of emotion regulation and executive function from preschool to kindergarten

Kenn Dela Cruz, UVA (Advisor: Tobias Grossmann)

Significant shifts in educational contextual factors occur as preschool children transition into kindergarten (Rimm-Kaufman & Pianta, 2000). The kindergarten environment has a

greater emphasis on explicit goals for literacy, numeracy, and socialization as compared to preschool settings (Haines et al., 1989). Given this qualitative shift from preschool to formal schooling, understanding how varying educational context factors dynamically evolve alongside children's emotion regulation and executive function warrants deep exploration. This study will examine how contextual educational factors at multiple levels (i.e., classroom quality & child's individualized engagement in the classroom) can contribute to individual differences in emotion regulation and executive function development from preschool to kindergarten. This study draws upon longitudinal data that examined how behavioral engagement in the classroom related to executive function and school readiness as children transitioned from preschool into kindergarten.

Poster

Syncing into connection: Bidirectional links between cognitive, emotional, and physical synchrony and connection between close others

Emily Diamond, UM (Advisor: Amie Gordon)

High-quality relationships are one of the most important predictors of well-being and are strongly linked to both mental and physical health across the lifespan (Holt-Lunstad et al., 2010). Yet what makes a relationship high quality? In the current work, we tested whether moments of synchrony—in which two people converge in their thoughts, emotions, or behaviors—are important components of connection and high quality relationships. In Study 1, using dyadic interaction data from 171 couples expressing gratitude to each other, we found evidence for a bidirectional link between observed synchrony and romantic relationship quality. Couples with greater relationship quality were more likely to show higher levels of synchrony in their thoughts, emotions, and behaviors during the interaction; in turn, those with higher levels of synchrony in their thoughts and emotions—but not behaviors—experienced a greater increase in momentary relationship quality from the beginning to the end of the lab session. In Study 2, we used self-report data from 269 people to study synchrony as it occurs in one's daily life. Participants who reported higher levels of synchrony in their thoughts, emotions, and behaviors with their closest friend or romantic partner also reported feeling more connected to that person, and this link did not vary based on whether they believed synchrony is an important component of momentary connection. Taken together, this work suggests that both observed and felt synchrony may be key components of connection and high quality relationships. In future work, I plan to more directly test whether this link is present across different relationship and life stages.

Poster

Emotional synchrony during couples' dyadic coping interactions across the adult lifespan

Myrto Dolcetti, UZH (Advisor: Mike Martin)

Dyadic coping (i.e., coping with stress as a couple) is essential for partners' well-being and couple functioning. Promptly attuning or "synchronizing" one's behavior to the behavior and needs of the stressed partner can be a key element of effective dyadic coping. Research evidence from various types of dyads (e.g., parent-child, therapist-patient) shows that synchrony (e.g., physiological, emotional) is associated with

perceived empathy or responsiveness and promotes interpersonal emotion regulation. However, research on synchrony in the context of couples' dyadic coping interactions is sparse. Aim of this study is to examine how emotional synchrony (i.e., the emotional coordination between the two partners) unfolds during those interactions. We take a "momentary", within-couple approach, since synchrony constitutes a dynamic process, influenced by situational changes. In particular, we aim to understand the interplay between emotional synchrony and partners' momentary stress expression and dyadic coping behavior. We hypothesize, for example, that emotional synchrony will be greater during moments of emotion-oriented dyadic coping compared to moments of problem-oriented or negative dyadic coping. Furthermore, we study if these interrelations are more prominent in interactions evaluated by the stressed partner as more beneficial and investigate possible age differences. We will use observational data from a sample of 119 couples belonging in three age cohorts, which participated in the tenth wave of a longitudinal study. Each couple conducted two 8-minute dyadic coping interactions in the laboratory and evaluated the interactions directly afterwards. In this study, the behavioral component of emotions will be considered, and in particular the facial emotional expressions of the partners, assessed second-by-second with an automated facial emotional analysis program. The stress expression and dyadic coping behavior of the partners are coded at 10-second intervals by trained human raters. Keywords: synchrony, facial emotional expressions, dyadic coping interaction, couples, lifespan

Presentation

The savanna hypothesis: Shared vs individual environmental preferences

Elena Isenberg, MPI for Human Development (Advisor: Simone Kühn)

In 1980, Gordon Orians suggested that all humans have an innate positive emotional response to savanna landscapes. The reasoning was that the savanna was the most beneficial biome for our survival in our evolutionary past. This idea was henceforth referred to as the "savanna hypothesis". The savanna hypothesis was tested in 1982 by John Balling and John Falk with images from six different terrestrial biomes, and they concluded that children have a preference for the savanna biome, while adults prefer the environment that they are most familiar with (Balling and Falk, 1992). The savanna hypothesis was also tested by Robert Sommer and Joshua Summit in 1995 and 1999, this time with line drawings of trees instead of landscape photos. They determined that the acacia form, found in the African savanna, was the most preferred tree form (Sommer and Summit, 1995; Summit and Sommer, 1999). These experiments have now been repeated in an online format, with 200 German-speaking adult participants, to investigate whether the savanna hypothesis can be validated in a larger sample. Participants submitted rankings and ratings of images from five terrestrial biomes (savanna, desert, rainforest, coniferous forest, deciduous forest) and additionally a "park" biome, as well as rankings and ratings of line drawings of different tree shapes. Preliminary results will be presented and discussed within the larger context of environmental preferences.

Poster

Exploring deliberate ignorance in childhood: The role of future-oriented cognition

Linda Kerbl, MPI for Human Development (Advisor: Ralph Hertwig)

Children's natural curiosity drives them to seek new information, attend to unexpected events, and test unusual hypotheses. It seems unlikely that they would willingly choose not to know. As adults, however, people frequently engage in deliberate ignorance, consciously choosing not to learn certain information even when it is readily accessible and personally significant. Despite extensive evidence of children's information-seeking behaviors, little is known about the emergence of decisions not to search for information. Here, we address this gap by exploring the developmental roots of deliberate ignorance in children aged 6 to 12. We propose that these roots are tied to children's developing future-oriented cognition—the capacity to simulate future states. As children's capacity to foresee the consequences of knowing certain information develops, we expect their propensity for deliberate ignorance to increase. We further hypothesize that children first exercise deliberate ignorance to protect their sense of safety and emotional well-being. Using narrated scenarios with varying degrees of potential informational threats, we examine parents' and children's assessment of 1) children's choices to seek or ignore the information, 2) their capacity to foresee the consequences of knowing or not knowing the information, and 3) their emotional evaluation of the information. Here, I will discuss preliminary data, our updated study design, and future directions for this research into the development of a cognitive strategy that becomes increasingly relevant in today's information-rich world.

Poster

Changes in epigenetic variability of the oxytocin receptor gene in childhood is associated with neural maturation

Minah Kim, UVA (Advisors: James P. Morris, Jessica Connelly)

The oxytocin receptor gene (OXTR) plays a crucial role in social behavior and emotion regulation. Methylation of OXTR (OXTRm) reduces receptor expression and has been associated with individual differences in socio-emotional behavior and neural maturity (Skyberg et al., 2023). This study investigates the relationship between neural maturity and OXTRm trajectories in children aged 4-13 years. We assessed the neural maturity of 68 children by examining the structural and functional connectivity between the amygdala and medial prefrontal cortex (mPFC), a well-established neural substrate for emotion regulation (Phelps et al., 2005). This connectivity typically shifts from positive functional coupling in childhood to negative coupling in adolescence (Gee et al., 2013). Linear growth curves were modeled for OXTRm values across three or four time points. Preliminary results indicated that children with more mature neural profiles—characterized by lower functional connectivity and higher streamline counts between the right amygdala and left frontal cortex, after controlling for sex, age, and brain volume—exhibited steeper increases in OXTRm over time. These findings suggest that children with more adult-like amygdala-mPFC connectivity experience greater increases in OXTRm, potentially reducing the efficiency of oxytocin signaling. Future research will explore how these OXTRm trajectories interact with socioemotional development in children.

Poster

Understanding social baseline theory using a computerized foraging task

Jingrun Lin, UVA (Advisors: James Coan, Joseph Allen)

384 participants (218 Males, 55% White, Mage = 35.81) completed a computerized foraging task with others under threat. Results showed that participants are more likely to forage in the presence of other social agents, adjusting for threat and resource availability ($p < .001$), supporting Social Baseline Theory from behavioral ecology.

Supporting Summary: Objective: Social Baseline Theory (SBT; Beckes & Coan, 2011) states that humans assume proximity to other humans. When this assumption fails, humans perceive an increased demand on their personal resources and capabilities, and health and longevity are compromised. In the presence of efficient coupling, increased foraging and decreased vigilance has been commonly observed across animal research (Kutsukake, 2007; Lanham & Bull, 2004). Gonzalez and colleagues (2021) conceptualized this capitalization of ecological energy conservation in the presence of non-threatening conspecifics as an instance of “yielding”. In other words, yielding refers to one’s capability or willingness to relax physiological investment to social affordances in response to threatening circumstances. Drawing from behavioral ecological research, the present study aims to better understand the concept yielding—an individual willingness to depend on social others in the presence of threat as an ecologically rational behavior. Method: 384 participants (218 Males, 55% White, Mage = 35.81) recruited from Prolific platform online completed a computerized foraging task, “Bears and Berries”, where they forage for virtual berries under the threat of a bear attack. In each game, players find themselves in a berry patch and must decide whether to forage or seek out another patch. While foraging, participants may find themselves with up to 5 other agents. We hypothesized that participants’ foraging choices (leave or forage) depend on resource availability (number of berries available), sensitivity to threat (presence of bear attack), and proximity to social resources (number of other social agents present). They also completed a series of personality and health-related questionnaires. The recruitment plan, hypotheses, and analyses were pre-registered on OSF: <https://osf.io/enbjm/>. Results: Using generalized linear mixed effect model, results revealed significant main effects of threat (estimate = 2.92, SE = 0.11, $p < .001$), number of berries available (estimate = -0.91, SE = 0.02, $p < .001$), and number of other social agents present (estimate = -0.19, SE = 0.01, $p < .001$). More specifically, participants were more likely to leave the trial (and not forage) when they perceive more threat, fewer berry resources, and encountered fewer other social agents. These effects remain significant after adjusting for demographic information. Canonical correlational analyses revealed that heightened sensitivity to berry resources during the foraging task predicted lower depression outcomes, as measured by Patient Health Questionnaire-9 and higher context sensitivity, as measured by Context Sensitivity Index, after residualizing for demographics, and videogame proficiency. Discussion: The present study is among the first to test Social Baseline Theory, using a behavioral ecology framework. Our findings showed that regression coefficient on social agents remains significant after adjusting for resource and threat availability on a given trial, suggesting that people prefer to be around others innately regardless of threat and resources. This study has significance in integrating interdisciplinary research, broadening understanding of yielding among human research, and demonstrating central tenets of social baseline theory in a behavioral ecological framework. Based on existing theoretical foundation on the role of allostasis in physical (Guidi et al., 2021) and mental health (Barrett et al., 2016), current findings will inform future efforts using physiological and imaging measures, in order to better understand the role of yielding in human social relationships and health.

Poster

Early expressive and receptive language development in preterm versus full-term infants: A meta-analysis

Miriam Löffler, UZH (Advisor: Moritz Daum)

Preterm birth (< 37 weeks gestational age) is a global public health concern, affecting more than 13 million (10%) infants worldwide annually. Although studies suggest that preterm infants are more likely to develop speech or language disorders compared to infants born full-term, research on language development of preterm infants in early childhood has yielded inconsistent results. This meta-analysis synthesizes existing literature on the early development of receptive and expressive language in preterm compared to full-term infants in the first 18.9 months. Studies must have used either the Bayley Scales of Infant and Toddler Development (BSID), version 3 or 4, or the MacArthur-Bates Communicative Development Inventory (CDI), all versions. We searched electronic bibliographic databases, including Scopus, Web of Science, and EBSCO, for studies published until December 2023. Our search yielded 9464 records. A total of 32 studies were eligible, and study outcomes were transformed into Hedge's g . Robust variance estimation was conducted for each outcome. Results indicate that children born preterm score lower in receptive ($g = -0.40$, CI 95 = [-0.60, -0.19], $p < .001$, $I^2 = 71.80$) and expressive ($g = -0.44$, CI 95 = [-0.63, -0.25], $p < .001$, $I^2 = 65.76$) language. For receptive language differences, birth weight, gestational age, and corrected age were significant moderators, suggesting that differences are greater for preterm children with lower birth weight, higher corrected age, and lower gestational age. We will end by discussing our results in light of previous research and uncovering gaps for future research.

Presentation

Interpreting individual differences in declarative and procedural brain network function during grammatical processing among elementary-aged children

Analia Marzoratti, UVA (Advisor: Tanya Evans)

Long-term memory is conventionally separated into distinct, interacting subsystems: declarative (DM) and procedural memory (PM). The declarative-procedural (DP) model of language learning posits a neurocognitive shift from reliance on explicit DM retrieval to more efficient, automated PM retrieval for language processing as mastery is achieved, particularly for rule-based grammatical content. However, the trajectory of precise roles of each memory subsystem during the development of grammatical processing in childhood is poorly understood. Additionally, it is unknown whether individual differences in the trajectories of language development impact the extent of engagement of each system for early grammatical processing.

This study leverages functional magnetic resonance imaging (fMRI) data collected in 7-year old children and multilevel modeling to quantify neural response patterns within established DM/PM brain regions during an auditory grammar task. We assess whether, based on the DP model, greater PM engagement corresponds with higher accuracy in grammar tasks and whether the extent to which this effect varies among same-aged children.

Our findings reveal robust, systematic differences in both DM and PM activity when processing grammatical errors compared to grammatically correct auditory sentences

as well as significant subject-level variability in the effects of task demand on brain activity. We also identify a positive impact of accuracy on left PM engagement, but only during the most challenging grammatical error task. Our analyses introduce further insight into the unique roles of DM and PM memory systems during language learning, while also highlighting the impact of individual differences in children's neurocognitive development during the language learning processes.

Poster

Can social-emotional skills enable disadvantaged youth to reach key benchmark qualifications? The intersection of SES, academic agency, ethnicity and sex

Francesca Mele, UZH (Advisor: Kaspar Burger)

Little is known about the role of social-emotional skills in supporting disadvantaged youth in completing key benchmark qualifications, and potential differences by social background, sex, ethnicity. This study addressed this gap by estimating linear probability models based on the nationally representative Longitudinal Study of Young People in England (N=15,770). The findings reveal that social-emotional skills (captured by academic expectations, academic self-concept, school engagement) significantly predicted the probability of completing at least secondary education, even when controlling for social background and academic achievement. Additionally, youth with fewer socioeconomic resources (i.e., lower parental education and class) benefitted significantly more from higher expectations and a more positive self-concept. These latter differences further varied by sex and ethnicity. These findings suggest that social-emotional skills may serve as compensatory resources for less socioeconomically advantaged students. However, distinct socio-emotional skills might support different disadvantaged subgroups in acquiring crucial benchmark qualifications of secondary education.

Presentation

Assessing pre-service teachers' motivational messages with a large language model

Olivia Metzner, Universität Potsdam (Advisor: Rebecca Lazarides)

Theoretical Background:

Recent research has examined the relation between teacher motivational messages, teacher motivation, and student learning, primarily using student self-reports (Putwain & von der Embse, 2018; Symes & Putwain, 2016). This approach is problematic due to the susceptibility to biases in research findings (Howard, 1980; Rosenman et al., 2011). Alternative methods, such as manual classification of teacher messages, are resource-intensive (Macanovic & Przepiorka, 2024). This study proposes an AI-based approach to objectively assess teacher motivational messages, using a fine-tuned Large Language Model (LLM) to overcome these limitations.

Research Question:

This study investigates whether AI-based methods, specifically LLMs, can reliably assess pre-service teachers' motivational messages.

Method:

We analyzed video data from 122 pre-service teachers during a 15-week course. First, the videos were transcribed with an AI software. Second, we developed a coding system for motivational messages based on self-determination theory (Ahmadi et al, 2023; Deci & Ryan, 2002) and annotated the transcripts with two human raters ($\kappa = .72$). Third, we used these annotations to fine-tune the LLM Gemma-7B (Banks & Warkentin, 2024). We split the annotated examples into a training and evaluation data set. Next, a prompt-based fine-tuning approach was applied to adapt the LLM to assess teachers' message behavior (Schick & Schütze, 2020). Finally, we evaluated the model's predictions by comparing them to human rater annotations.

Results and Significance:

The fine-tuned LLM achieved an average accuracy of 72.27% across all categories. It performed well in classifying supportive messages but did not reach acceptable F1-score for thwarting messages and out-of-domain data due to unequal data distribution. The results indicate that while the LLM can reliably classify teacher messages, further fine-tuning with a balanced data set is needed to improve accuracy for less frequent message types.

Poster

Person or the situation? Understanding how system level and individual level predictors of bias shape police search decisions

Margaret Meyer, UM (Advisor: Richard Gonzalez)

Previous research has demonstrated that police officers exhibit racially biased search practices. These models are predominately limited to measures of bias at the aggregate. These aggregated models ignore the rates of bias for individual officers working within a police department. We compare a measure of bias that accounts for the unknown contraband rate to those models that do not in individual officers. We explore the effect of individual (race, age) and systemic predictors (county level IAT scores) on these measures of bias. Interestingly greater differences in White/Black perceptions on the Weapons IAT predicts recovery rate, while greater differences in White/Black perceptions on the Race IAT predicts false alarm rates in officers.

Poster

Applying computational modeling to forced response conflict tasks in adults with ADHD

Jahla Osborne, UM (Advisors: John Johnides, Priti Shah)

It is widely understood from empirical studies and anecdotal experiences that Individuals with ADHD are highly distractible by external stimuli, such as noises and visual stimuli. However, the underlying behavioral mechanisms behind this susceptibility warrant further exploration.

How might diagnostic status (Healthy Control vs. ADHD) impact responses to irrelevant, conflicting stimuli ? Do adults with ADHD perform worse (based on accuracy and response time) due to slower goal-directed processing or faster habitual processing ? Research shows ADHD medications (e.g., Vyvanse, Strattera) appear to improve attention

and productivity. Is this improvement due to a speeding up of goal-directed processing or a slowing down of habitual processing in medicated ADHD patients? We aim to answer these questions using the novel forced-response paradigm in two conflict tasks (Flanker and Simon tasks). We will computationally model participant behavior based on preparation time and accuracy. We are recruiting adults with ADHD who regularly take medication. Using a cross-over design, participants will complete tasks once on medication and once unmedicated, with counterbalanced task and medication order. Healthy control participants will also complete the conflict tasks. Preliminary results suggest unmedicated ADHD speeds up habitual processing compared to both healthy controls and medicated ADHD participants. Additionally, medicated ADHD appears to speed up goal-directed processing compared to unmedicated ADHD.

Presentation

Heart-brain interactions across the lifespan and the role of the locus coeruleus

Agata Patyczek, MPI for Human Cognitive and Brain Sciences (Advisor: Arno Villringer)

The heart and brain are bidirectionally connected, integrating autonomic functions such as heart rate and blood pressure with cognitive and emotional processing. At the interface between the two lies the locus coeruleus (LC), a primary source of norepinephrine in the brain with connections to the autonomic nervous system. However, the LC is particularly vulnerable to neurodegeneration even in healthy aging. LC-sensitive MRI studies indicate an inverted U-shape pattern in LC signal intensity, peaking around 60 years of age, followed by a decline associated with reduced structural integrity likely from potential neuronal loss. This decline shows considerable inter-individual variability, which may reflect differences in autonomic nervous system activity that also exhibits age-related changes. Previous research in older adults has associated higher LC structural integrity, as measured by MRI signal intensity, with lower heart rate variability (HRV), a key indicator of parasympathetic activity. However, the interplay between LC structural integrity, HRV, and aging, remains unclear. To address this gap, Study 1 will investigate the bidirectional relationship between LC structural integrity and HRV over time. This longitudinal analysis will assess whether baseline measures of LC structural integrity or HRV can predict changes in the other measure over time, and vice versa. Further, given the shift in autonomic balance with aging—characterized by decreased parasympathetic tone and increased sympathetic activity—Study 2 will examine how LC structural integrity relates to sympathetic indices of cardiovascular activity in older adults. Understanding these complex interactions could provide valuable insights into common mechanisms underlying cognitive decline and autonomic dysregulation in older adults, potentially informing the development of targeted interventions to maintain cognitive and autonomic health in aging populations.

Presentation

(Un)published: The scope of publication bias in two large German socio-economic panels

Caroline Poppa, Share Berlin (Advisor: David Richter)

Publication bias is the prioritized and selective reporting of scientifically significant results. In contrast to the widespread assumption that this bias arises primarily from

editorial desk-rejections, recent research indicates that authors themselves decide much more frequently not to publish or submit their insignificant results. This can mean that a) researchers only submit significant results without mentioning non-significant results (= selection bias at the hypothesis level), or b) researchers refrain from writing up and submitting studies yielding non-significant results altogether (= file drawer bias at the output level). This can be problematic because time and effort are invested in repeating research that has already been carried out, but never reported. In addition, the knowledge gained from non-significant results (by assuming the null hypothesis) is lost. In psychology, the effects of this selective pressure became evident in the "replication crisis". The prevalence of file drawer bias in studies conducted within a representative US panel infrastructure has shrunk from roughly 65 per cent between 2002 – 2012 (Franco et al., 2014) to 28 percent between 2012 – 2018 (Moniz et al., 2023). While this bodes well for the open science movement, no comparable meta-analytic approach has investigated the prevalence of publication bias in German panel infrastructures. In our project, we investigate different aspects of publication bias using two probabilistic representative German panels (GESIS Panel and SOEP-IS, 2012 -2021). This talk will cover first insights derived from the comparative analysis of successful study proposals and their subsequent publications.

Poster

Maintaining valenced memories: The effects of task parameters on working memory for positive and negative emotions

Kali Sarver, UM (Advisor: Patricia Reuter-Lorenz)

Affective working memory (AWM) refers to the ability to maintain an emotional feeling state in the absence of the eliciting stimulus. An emotion maintenance task is used to measure AWM abilities where participants view two consecutive emotional images, matching in valence but differing in intensity, after which participants decide which image evoked a more intense experience of emotion. Previous studies, for example, by Waugh and colleagues (2019), concluded that negative emotional states are more difficult to maintain, though contrasting findings exist, with other studies indicating better performance in the negative than in the positive valence condition among young adults. Further evaluation of emotion maintenance ability through analyses of intensity order by Waugh et al. (2019) showed that accuracy is lower when the first image is more intense than the second image ($1 > 2$), compared to the opposite order ($2 > 1$), especially for negative feelings. We investigate potential valence differences in AWM ability in two studies: (1) a new study that recruited a sample of young adults ($N = 91$) and (2) a re-analysis of existing datasets from our laboratory via meta-analyses ($N = 388$). In line with previous research, both studies revealed higher overall accuracy in the $2 > 1$ condition. However, we found poorer performance in the positive valence than neutral valence, especially in the $2 > 1$ condition. We will discuss potential explanations for our results and discuss why age could be a crucial factor in clarifying any differences between the present studies and prior research on intensity order and valence effects.

Poster

Parent-child functional similarity during movie-watching

Sofia Scatolin, UZH (Advisor: Nora Raschle)

Parents exert a significant influence on their children's development through both genetic and environmental pathways. Behavioral studies have demonstrated this intergenerational transfer across various behaviors, including attachment styles, emotion regulation strategies, and the development of psychopathologies. However, the extent to which this transfer can be observed at the neural level remains unclear. This study aims to investigate neural similarity within parent-child dyads during naturalistic movie-watching. Participants included 63 families (57 mothers, 46 fathers, 61 boys, and 48 girls, aged 6 to 14) who watched a 12-minute montage of clips from the movie *Inside Out* while undergoing fMRI. We extracted neural activation time courses from 50 regions of interest for each participant. Neural similarity was then assessed by correlating the time courses across each possible adult-child dyad. Our results indicate that, across the entire brain, parent-child dyads exhibited significantly higher neural similarity compared to stranger-child dyads. Future analyses will explore differences between matrilineal and patrilineal transmission, as well as the relationship between neural similarity, behavioral similarity, and child behavior. These findings contribute to our understanding of the mechanisms underlying intergenerational transmission and the identification of factors that may support or hinder this process.

Presentation

Educational expansion and changes in the social origin composition of tertiary graduates: Comparing cohorts born 1948-1992 in six countries

Kevin Schönholzer, UZH (Advisor: Kaspar Burger)

This study examines how educational expansion has impacted the social origin composition of tertiary graduates across Australia, Great Britain, Russia, South Korea, Switzerland, and the United States. Using harmonized longitudinal data from six long-running household panels via the Comparative Panel File for cohorts born between 1948 and 1992, we investigate changes in parental education distributions, changes in the probabilities to attain tertiary education across social origins, and the evolving social origin compositions of tertiary graduates. We also explore trends in downward educational mobility relative to parental education. We find that the share of individuals from tertiary-educated parents increased universally. The probability of attaining tertiary education between social origins varied, with some countries showing narrowing gaps and others maintaining stable differences. The social origin composition of tertiary graduates varies markedly across countries and cohorts. Australia, Switzerland, and Russia show consistently higher and strongly increasing shares of tertiary graduates from advantaged social origins. In contrast, Great Britain, South Korea, and the USA exhibit initially lower proportions of tertiary graduates from advantaged social origins, with a more gradual increase over time. Despite overall expansion, most countries show increasing proportions of downwardly mobile individuals. We qualitatively discuss how factors such as the pace of educational expansion, inequality within higher education systems, and vocational education sector structures may contribute to these divergent patterns. Our study provides a comparative analysis of educational mobility trends, highlighting the complex interplay between educational expansion, social origin, and tertiary attainment. The findings underscore that expansion alone does not necessarily lead to increased equality in educational outcomes across social origins.

Poster

Each step counts: Crafting a development score using standardized milestone attainment data

Sandro E. Stutz, UZH (Advisors: Moritz Daum, Stephanie Wermelinger)

This project investigates whether caregivers' use of a development diary app (Pebbles App; <https://www.pebbles-app.com>) influences the development of their children. This influence could be evident by changes of the age at which developmental milestones are attained (Age of Attainment; AoA). The Pebbles App collects data on the timing of developmental milestones by asking caregivers if their child already achieved certain abilities and, if yes, how long ago. Here, we present one potential method to calculate a general developmental score from the AoAs. A normative distribution for each milestone is created by bootstrapping AoA data of all the children already documented by the app. These normative distributions are then used to z-standardise the AoAs, with a child's general developmental score being their average z-score. This score estimates the extent to which the child tends to reach milestones at an earlier, average or later point in time when compared to all the other children that have been documented by the app. A reliable development score based on the AoAs of milestones would allow the comparison between different children documented by the Pebbles App. Generally, the study's findings may elucidate Pebbles App's potential as an intervention tool, extending beyond its primary function as a developmental diary app. Furthermore, it could offer insights into the creation of analogous applications and illuminate the underlying mechanisms relevant to child development.

Poster

Development of a self-report scale assessing beliefs about exhaustion

Beatrice Tărăpoancă, UZH (Advisor: Alexandra M. Freund)

The metaphor of a battery that gets depleted when engaging in effortful activities and needs to be recharged in a recovery period has governed much of psychological research over the past decades (Baumeister et al., 1998). This depletion model has been extensively criticized on theoretical and empirical grounds (Inzlicht & Friese, 2019), but might nevertheless be the predominant belief lay people hold about exhaustion. An alternative lay belief inspired by the metaphor of a break-through when pushing the boundaries of what seems possible might be that persisting despite feeling exhausted leads to performance gains. To capture these different beliefs, we have developed items for a self-report scale of subjective beliefs about exhaustion. These items are currently being tested in an online study with a targeted sample size of N = 492 adults per group, aged 18 – 85 years. We will present the results of this study regarding the reliability (factor structure, internal consistency, measurement invariance across age groups) as well as the convergent and discriminant validity with established psychological constructs. The scale aims to offer a tool that can be used to further investigate in subsequent studies how different beliefs about exhaustion influence motivation and behavior.

Presentation

Using computational modeling to formalize an integrated psychosocial theory of loneliness

Emma Toner, UVA (Advisor: Bethany A. Teachman)

Chronic loneliness is an urgent public health crisis associated with a range of mental and physical health consequences. Though treatments for loneliness exist, they are associated with only modest reductions in loneliness, and loneliness has continued to rise in recent decades. To more effectively treat and prevent loneliness, we need a clearer understanding of why loneliness develops and how it becomes chronic. There have been at least three key barriers to making more progress in loneliness research: (1) the lack of an integrated, interdisciplinary conceptualization of loneliness; (2) a reliance on imprecise verbal theories (i.e., theories that lay out the mechanisms hypothesized to drive loneliness in words only, without quantitatively specifying the relationships); and (3) the use of statistical approaches that cannot capture the complex, nonlinear interactions among variables likely driving loneliness. My dissertation aims to reduce these barriers by uniting interdisciplinary perspectives on loneliness via a systematic review, formalizing an integrated theory of loneliness using computational modeling tools (agent-based and differential equation modeling) that can represent complex systems, and precisely evaluating if and how well the formal theory can explain the development and maintenance of chronic loneliness over time via computational model simulations. Results will provide a systematic assessment of loneliness theories, help identify novel research questions, and pinpoint targets for intervention and prevention efforts. This presentation will focus on work completed for the systematic review and on our plans for developing and testing the computational model of loneliness.

Poster

How does children's trust evolve in a repeated trust game?

Rose Wang, UM (Advisor: Felix Warneken)

Trust enables reciprocity and sustained cooperative relationships. Therefore, being able to determine who can be trusted is crucial. Trusting a trustworthy partner maximizes mutual benefits; withholding trust from an untrustworthy partner minimizes chances of being exploited. Little is known about the developmental origin and cognitive foundation of trust in young children. The current study examined how children learn about their partner's trustworthiness and adjust their trust behaviors based on experience. Children from 6 to 11 years old played 20 trials of the trust game with a trustworthy and an untrustworthy partner. We examined developmental differences in children's perceived trustworthiness and their actual trust behaviors towards both partners. We also used reinforcement learning models to examine the role of initial trust and experienced trustworthiness in the learning process.

Poster

Racial identity and school climate experiences: A critical combination

Allison Ward-Seidel, UVA (Advisor: Sara Rimm-Kaufman)

Middle school students' experiences of their school environment influence their attitudes toward school and learning behaviors. Furthermore, early adolescence is a critical time of identity and social development when youth are typically in middle school. The Phenomenological Variant of the Ecological Systems Theory (PVEST) guides this

investigation of the relationship between racial identity and school experiences that predict students behavioral and cognitive development. This study draws on student survey data from 308 Black 6th grade students (Mage = 11.12, SD = 0.41; 49% female) in suburban middle schools in the Midwest United States. Latent profiles of students' perceptions of equitable school climate will be determined based on four student-reported indicators including teacher caring, school fairness, school-based discrimination from peers, and school-based discrimination from teachers. Latent profiles of equitable school climate experience will then be analyzed as moderators in the relationship between students' racial identity beliefs (i.e., centrality, private regard, and public regard) and school engagement (i.e., behavioral engagement and cognitive engagement). Because students' personal attributes and lived experience (e.g., racial identity beliefs) influence how they interpret their surrounding environment (e.g., school climate) and consequently how they develop adaptive or maladaptive patterns of behavior (e.g., engagement), this investigation stands to contribute to the literature and practical applications regarding Black students' experience of equitable school climate and academic engagement. Results are in progress.

Poster

The influence of recalling past (im)moral behavior on prosocial behavior – A network meta-analysis on moral balancing

Jasmin Weber, UZH (Advisor: Alexandra M. Freund)

Research on patterns of moral behavior over time indicates that sequential moral decisions can influence one another. More specifically, an initial moral or immoral behavior can increase the likelihood of subsequently engaging in behavior of the same moral value (moral consistency) or the opposite moral value (moral balancing). There are two forms of moral balancing: Moral licensing refers to the phenomenon that acting in a moral way increases the tendency to display immoral behavior, whereas moral compensation refers to the reverse pattern in which acting in an immoral way increases the tendency to display moral behavior. Moral balancing is primarily explained in terms of a continuous conflict between the desire to maintain a positive self-perception and emotional state and the desire to avoid the costs of moral and reap the benefits of immoral behavior. A widely used manipulation in the moral balancing literature is to ask participants to recall and describe a past moral, immoral, or neutral behavior. In an attempt to provide a systematic review of studies on sequential moral behavior using recall tasks that considers all available evidence, we plan to conduct a network meta-analysis of experimental studies that compare moral, immoral, and neutral conditions with respect to subsequent moral decisions. The aims of this review are to better understand how initial behaviors influence target behaviors in the moral domain, to obtain an estimate of the overall effect size of moral compensation and moral licensing, and to identify potential moderators, mechanisms, and boundary conditions of moral balancing.

Poster

Accounting for cultural factors in PISA – An exploration using moderated non-linear factor analysis (MNLFA)

Gillian (Rujun) Xu, UVA (Advisor: James Soland)

Background/Context:

The Programme for International Student Assessment (PISA) is a triennial global education assessment providing various tests that measure student ability in solving academic problems in different domains, as well as surveys that include a large battery of psychological/socio-emotional constructs such as instrumental motivation and domain-specific self-concept (Schleicher & OECD, 2018). PISA is globally influential in the field of education and national education policymaking is that it allows for cross-national comparison on both academic outcomes and affective measure outcomes, which can be combined to shape education policy. With the cross-national comparison results, PISA gives feedback on whether the education system in a country is improving its effectiveness over years, which not only reflects the past education achievement of a country but also influences policymakers' future education decisions. A lot of countries conduct policy reformations according to PISA's suggestions (Gorur & Wu, 2015; Yang & Fan, 2019); therefore, it is crucial to make sure that PISA's cross-national comparisons are valid, which requires the items to perform consistently for students from different backgrounds. However, in reality, factors like translation across languages and cultural background difference could result in different interpretations for the same item and biased results (Asil & Brown, 2016). Thus, detecting and accounting for such sources of bias is important and could promote equity and effectiveness of global education policy making in the future.

To account for cultural differences and other sources of bias that can lead to inconsistencies in measurement, the typical method is to conduct Measurement Invariance (MI) analysis, which examines whether the measure is consistent regardless of participants' group membership (e.g., cultural backgrounds; Bauer, 2017). The traditional method to examine MI is Multiple Group Confirmatory Factor Analysis (MG-CFA). However, MG-CFA could only account for one categorical factor at a time, which is far from fully teasing out the potential non-invariant factors in real-world data. In addition, various studies exploring the PISA datasets using MG-CFA failed to establish MI (Gungor & Atalay Kabasakal, 2020; Odell et al., 2021; Segeritz & Pant, 2013; Yildirim and Aybek, 2019). MNLFA, on the other hand, is more flexible in that it can address more than one factors in a single analysis, and it also allows for continuous factors as well as interactions between factors. Not only can MNLFA detect sources of non-invariance but it can also account for non-invariance by assigning items with different weight for people from different cultural backgrounds. Studies have shown that MNLFA was effective in addressing non-invariance in various psychological measures (Bauer, 2017; Pacheco-Colon et al., 2019; Rose et al., 2018).

Purpose/Objective/Research Question:

The purpose of this article is to investigate and account for potential non-invariance in the affective and motivational PISA science scales with MNLFA, given that the majority of studies focused on psychological constructs in mathematics. Following the previous studies, we control for student gender, socioeconomic status, and immigration status and analyze if science motivation and science efficacy items demonstrate measurement non-invariance. The majority of studies included as the constraint covariates, but we used test languages instead to also reflect potential translation issues. We are also interested in identifying the items and language groups that cause non-invariance. After reassigning the noninvariant items different weights and establishing a full model to account for the non-invariance, we aim to correct the individual scores. The ultimate goal is then to compare the original CFA scores with the corrected MNLFA scores to investigate how much the scores changed when non-invariance in the scales is accounted for.

Methods:

Sample

The study sample of $N = 130,164$ was extracted from the PISA 2015 dataset. A total of 16 countries with 15 different test languages were selected. Given the strong relationship between learning motivation and test performance, the 16 countries were selected based on their science literacy performances to make sure the country-level variance in science literacy outcomes, so that the sample covers all the country-level science score ranges (below 450, between 450 and 500, and above 500). Only students who completed the survey instruments consisting of eight items on self-efficacy and four items on learning motivation were included.

Measures

All of the measures used in this study were part of the publicly available PISA 2015 dataset. Those measures include both item-level data for the survey instruments, as well as variables used as moderators. The PISA 2015 dataset had four scales that measured socioeconomic status from different perspectives. We conducted a principal component analysis based on these four scales and used the factors scores as our socioeconomic status moderator. All other moderators were dummy coded.

A four-item self-reported science learning scale was used to indicate student perceived motivation to study science with a four-point Likert scale ranging from Strongly agree to Strongly disagree. The science self-efficacy scale was also self-reported and it contained eight items indicating how easy it would be for students to perform various tasks in science, with a four-point Likert scale ranging from I could do this easily to I couldn't do this. (OECD, 2017b: 38).

Analysis:

We used a typical 4-step MNLFA procedure outlined by Bauer (2017) to conduct our analyses. First, we ran the baseline model with no constraint variables and obtained the baseline parameters. Second, we ran the model with the baseline parameters as starting values and added all the constraint variables. Then with the constrained parameters, we let each item to be moderated by the covariates. That is, we went item by item to examine non-invariance. Finally, we combined these item-by-item analyses to create a complete non-invariance model. With the full model, we then re-estimated the science motivation and efficacy scores to determine if the adjusted score is different from the original score.

Findings & Conclusions:

Our study indicated that all the items in self-efficacy and learning motivation scales had significant predictors for both loadings and thresholds. That is, all the items demonstrate non-invariance to different extent. Converting thresholds into probabilities, Figure 1 indicates that students from different cultural backgrounds had very different probabilities of endorsement on the same item, and this is true for most of the items in self-efficacy scale. However, the probabilities of endorsement in learning motivation scale did not change much for students with different backgrounds (Figure 3). Item weights were calculated from loadings and varied when changing cultural backgrounds in learning motivation scale but not so much in self-efficacy scale (Figure 2 and 4). Comparing personal scores from the regular CFA score with the MNLFA score, we concluded that both scores were highly correlated, but MNLFA scores were better at differentiating students when the scores were at extremes (Figure 5).

Poster

Hormonal intrauterine device use and three-dimensional mental rotation skills in women

Ran Yan, UM (Advisor: Adriene Beltz)

Over 150 million women use hormonal intrauterine devices (IUDs) that prevent pregnancy by releasing a constant dose of the androgenic progestin levonorgestrel into uterine tissue. Past research has linked androgenic progestins to enhanced spatial skills, particularly three-dimensional (3D) mental rotations; yet there is no systematic research on spatial skills in IUD users. The current study filled this knowledge gap, comparing IUD users to oral contraceptive users and naturally cycling women. IUD users were hypothesized to outperform other groups due to their continuous levonorgestrel exposure.

Data collection is ongoing, with 184 participants (M age =21.86, SD=4.72; 74.5% White; 84.2% non-Latina) having no gynecological problems or hormonal medication intake and using the same hormonal contraceptive—or not—for ≥ 3 months: 48 hormonal IUD users, 41 naturally women not menstruating, and 95 oral contraceptive users on active pill.

Participants came from a Midwest university and surrounding community. They completed laboratory-based testing of their spatial skills using the 20-item Vandenburg and Kuse 3D Mental Rotation Task. A point was received for an item when 2 of 4 accurate rotations of the 3D target image (shown in 2D space) were identified.

One-way analyses of (co)variance were used to examine group differences in performance, with Tukey-LSD follow-ups; sensitivity analyses controlled for age and general cognitive ability (indexed by vocabulary). As expected, IUD users (M=12.10, SD=4.73) had better mental rotations performance than naturally cycling women (M=9.59, SD=5.31), $p=.018$, $d=0.51$, but not oral contraceptive users (M=10.65, SD=4.87), $p=.099$, $d=0.30$. Differences between IUD users and naturally cycling women persisted, with reductions in effect size, when age ($d=0.50$) and general cognitive ability were controlled ($d=0.31$).

Findings are consistent with the notion that high androgenic activity of progestins in IUDs promotes spatial skills. Future work will unpack the heterogeneity of oral contraceptive formulations (e.g., androgenic activity) in a larger sample.