

ISIR 2026

WARSAW, POLAND

JULY 13–16, 2026

*27th Annual
conference
held at the
University
of Warsaw*



PROGRAM

*International Society for
Intelligence Research*



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Cover design

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About

Founded in 2000, ISIR is the focal scientific society for researchers studying human intelligence. Although the society's primary focus is human intelligence, we are also interested in cognitive abilities in other species. Artificial intelligence is not currently a focus of the society. In 2025, Thomas Coyle and Richard Haier established *Intelligence & Cognitive Abilities*, a new open-access journal and ISIR's flagship journal, to meet the growing need for an unbiased publication platform committed to free inquiry. ICA welcomes well-conducted empirical studies and theoretical articles from a variety of perspectives, including psychometrics, genetics, individual differences, evolutionary theory, and neuroscience. ISIR shares a commitment to civility, open dialogue, and respect. We hold an annual conference, usually in July. Scholars attend from around the world to present their latest research, hear new findings, and revisit older ones.

Conference information

ISIR Annual Conference 2026 takes place at the University of Warsaw in Warsaw, Poland. The conference will be held from Tuesday, July 14 until Thursday, July 16, with a special pre-conference event on the afternoon of Monday, July 13. Further information and updates will be announced on the [ISIR website](#) as they arise.

Our local host is **Marcin Zajenkowski** of the University of Warsaw. ISIR's distinguished honors include the **Distinguished Contributor Interview**, featuring **Terrie E. Moffitt** as interviewed by David Lubinski, and the **Constance Holden Award for Distinguished Journalism**, which will be received by **Steve Ayan**. This year's keynote lectures will be delivered by **Anna-Lena Schubert**, **Adam Chuderski**, and **Maciej Karwowski**.

ISIR President and Board 2026

President:	Jakob Pietschnig
Past President:	Thomas R. Coyle
President Elect:	Timothy Bates
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Board:	Elsbeth Stern, James Lee, Sandra Oberleiter
Communications Officer:	Emily Willoughby

Timetable

All times listed in the schedule are in **Central European Summer Time** (CEST; UTC+2.)

Schedule key:

-  **RT** : Regular Talk
-  **KL** : Keynote Lecture
-  **SY** : Symposium/Panel
-  **LA** : Lifetime Achievement Awardee
-  **DC** : Distinguished Contributor Interview
-  **CH** : Constance Holden Award for Distinguished Journalism

Note: Student presenters are eligible for the **Best Student Paper** and **Best Student Poster awards**. For judges' convenience, student talks and posters are labeled with .

Monday, 13th of July (University of Warsaw Old Library)

3:15–4:00	Registration		
4:00–4:15	Opening remarks		
4:15–5:15	KL	Terrie E. Moffitt Duke University; King's College London	What if we could measure how fast we are aging while we are still healthy? Cognitive health and the pace of aging
5:15–6:15	KL	Avshalom Caspi Duke University; King's College London	Why do people have multiple mental disorders, and why do different mental disorders share common causes and consequences? Data from three nations and three generations
6:30–8:30	Welcome session, drinks and heavy hors d'oeuvres courtesy of the IMC		

Tuesday, 14th of July (University of Warsaw Old Library)

8:45–9:00		Opening remarks	
9:00–10:00	KL	Anna-Lena Schubert Johannes Gutenberg University Mainz	From neural noise to cognitive architecture: a formal model of why abilities covary and why they covary differently across individuals
10:00–10:30		Morning coffee break	
10:30–11:30		Symposium I: Intelligence and the self: cognitive biases, decision-making, and well-being	
10:30–10:45	SY	Gilles Gignac University of Western Australia	Patterns, preferences, and prudence: why intelligence predicts financial success
10:45–11:00	SY	Radosław Rogoza Vizja University	As intelligent as a narcissist? Bidirectional relations between narcissism and intelligence in a daily diary study
11:00–11:15	SY	Maciej Stolarski University of Warsaw	Smarter time travel? Intelligence strengthens the well-being benefits of a balanced time perspective
11:15–11:30	SY	Marcin Zajenkowski University of Warsaw	From cognitive bias to intellectual grandiosity: how narcissism fuels the overvaluation of intelligence
11:30–12:30		Regular talks: Social, educational, and developmental factors	
11:30–11:45	RT	Ersie Gentzis New Mexico State University	The role of hope and motivation in emotional and behavioral outcomes among intellectually gifted adolescents
11:45–12:00	RT	Anna Turek University of Warsaw	Too smart to be wrong? Narcissism and the illusion of intelligence in children
12:00–12:15	RT	Maximilian Krolo Saarland University	The cognitive complexity–openness hypothesis revisited: disentangling the role of intelligence and personality for political orientations S
12:15–12:30	RT	Vincent Stabile Oakland University	Perceptions of a partner's intelligence are fallible and liberally biased: evidence from romantic dyads S
12:30–2:00		Lunch	
2:00–3:30		Regular talks: Measurement, psychometrics, and genetics	
2:00–2:15	RT	Friederike Busse Ulm University	Novel and improved tests for visual abilities S
2:15–2:30	RT	Gilles Gignac University of Western Australia	A–B or H–W? Are large language models reasoning or relying on learned associations?
2:30–2:45	RT	Andrew Buonaccorsi University of Minnesota	Intelligence and personality share a genetic and biological basis S

2:45–3:00	RT	Johanna Heller University of Vienna	The generality of intelligence heritability: a multiverse multilevel meta-analysis of twin studies S
3:00–3:15	RT	Sandra Oberleiter University of Vienna	How do multimodal large language models perform on a standardized intelligence test battery? A psychometric comparison with human data
3:15–3:30	RT	Paul Westrick Independent Researcher	Why don't they report that? The lingering effects of early twentieth-century intelligence testing on twenty-first-century educational measurement
3:30–4:00	Afternoon coffee break		
4:00–5:00	Distinguished contributor interview		
4:00–5:00	DC	Terrie Moffitt Duke University; King's College London	Distinguished Contributor Interview (interviewed by David Lubinski)
6:00–8:00	Poster session with drinks and heavy hors d'oeuvres in foyer		

Wednesday, 15th of July (University of Warsaw Old Library)

9:00–10:00	KL	Adam Chuderski Jagiellonian University	Relational structures in the human brain
10:00–10:30		Morning coffee break	
10:30–11:15		Symposium II: Well beyond g: travelling outside of Spearman's Flatland	
10:30–10:45	SY	Michael Woodley of Menie Independent Researcher	"Either this is madness or it is Hell." "It is neither," calmly replied the voice... "it is knowledge; it is two gs."
10:45–11:00	SY	Michael Woodley of Menie Independent Researcher	When Spearman's hypothesis reverses: incarceration, non-shared environmentality, and between-group variance partitioning
11:00–11:15	SY	Mateo Peñaherrera-Aguirre University of Arizona	Tilt super-residual projection traces are non-additively heritable and non spurious
11:15–12:15		Regular talks: Development, context, and group differences	
11:15–11:30	RT	Marco Balducci University of Turku	Beyond mean scores: sex differences in literacy, numeracy, and problem-solving as intraindividual strengths across age groups
11:30–11:45	RT	Christian Becker Military Psychological Service, Austrian Military Health Services	Convergence from below or erosion at the top? Ability segment-differentiated Flynn effects suggest a decreasing performance gap between gifted and non-gifted Austrian conscripts S
11:45–12:00	RT	Jonas Lesigang University of Vienna	A Flynn effect for executive functioning: evidence for domain differentiation in three distinct tests in Austria S
12:00–12:15	RT	Kayla Garner Northwestern University	Context-specific personality associations between cognitive ability and political ideology S
12:15–1:45		Lunch	
1:45–3:00		Regular talks: Cognitive mechanisms, neuroimaging, and reasoning	
1:45–2:00	RT	Oliver Bruton Carl von Ossietzky Universität	Neurofunctional coupling of the insular cortex and general intelligence (g) S
2:00–2:15	RT	Yoav Ganzach Tel Aviv	What's in a tilt? The differential effects of verbal and mathematical abilities on educational and economic success
2:15–2:30	RT	Henrike Jungeblut Johannes Gutenberg University	Uncovering the latent organization of brain white matter microstructure and its link to fluid intelligence S

2:30-2:45	RT	Knute Johnson University of Minnesota	Lapses during a speeded number-comparison task may be indicative of a meta-cognitive performance monitoring mechanism S
2:45-3:00	RT	Delaney Ross University of Minnesota	The value of critical thinking: a meta-analysis S
3:00-3:30	Afternoon coffee break		
3:30-4:30	CH	Steve Ayan Writer & Journalist	Constance Holden Address
7:30-9:30	Banquet at Restauracja BursztyNova		

Thursday, 16th of July (University of Warsaw Old Library)

9:00–10:00	KL	Maciej Karwowski University of Wrocław	The intelligence–creativity nexus revisited: insights from the Warsaw study
10:00–10:30		Morning coffee break	
10:30–11:45		Regular talks: Genetics, evolution, and societal context	
10:30–10:45	RT	Nico Buettner University of Minnesota	Examining the effects of political institutions on personality and intelligence: evidence from Germany and the Former Soviet Union
10:45–11:00	RT	Emily Willoughby University of Minnesota	The first twin decomposition of diffusion-model parameters and intelligence shows genetic overlap concentrated in evidence accumulation
11:00–11:15	RT	Tobias Wolfram Herasight Research	Intelligence as a target for preimplantation genetic testing
11:15–11:30	RT	James Lee University of Minnesota	Recent human evolution
11:30–11:45	RT	Jakob Pietschnig University of Vienna	Systematic effects of prosperity and equality on sex differences in PISA, TIMSS, and PIRLS assessments: within-country effects, between-country effects, or both?
11:45–1:15		Lunch and Business Meeting	
1:15–3:00		Regular talks: Education, achievement, cognitive theory, and perspectives	
1:15–1:30	RT	Alexandros Giannelis Erasmus University Rotterdam	A large-scale adoption study on the intergenerational mobility of education and income
1:30–1:45	RT	Elsbeth Stern ETH Zürich	Intelligence as a driving force in taking advantage of cognitively activating STEM curricula: evidence from three controlled intervention studies
1:45–2:00	RT	Kirsten Hilger Würzburg University	Multimethod prediction of human intelligence from structural brain connectivity
2:00–2:15	RT	Jörn Sparfeldt Saarland University	How intelligence translates to successful complex problem solving: the mediating effect of the effective strategic behavior VOTAT
2:15–2:30	RT	Andreas Demetriou Cyprus Academy of Sciences, Letters, and Arts	General intelligence as recursive hierarchical inferential control: a unified evolutionary–developmental framework

2:30–2:45	RT	Kristof Kovacs ELTE Eotvos Lorand University	The Garfield effect: how time of day and day of week influence performance on cognitive ability tests in teenagers
2:45–3:00	RT	Leo Hesting Association for Smarter Youth	History of advocacy in intelligence research (HAIR): “They accomplished much good in the world”
3:00–3:30	Afternoon coffee break		
3:30–4:30	SY	Kirsten Hilger, Kristof Kovacs, Sandra Oberleiter, and Emily Willoughby Moderated by Elsbeth Stern	Future directions in research on intelligence: Early and mid-career scientists think big

Abstracts

Abstracts are listed in alphabetical order by presenting author's last name. If a given presentation has more than one author, presenting author's name is underlined.

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-  **SY** : Symposium/Panel
-  **PP** : Poster Presentation
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Influence of PTSD on perceptual reasoning among students of St. Bakhit Girls' and St. Patrick Boys' Secondary Schools in Narus, South Sudan

Innocent Afen

PP

The Catholic University of Eastern Africa, Nairobi, Kenya

Post-traumatic stress disorder is a major mental health issue among conflict-affected populations, posing a substantial cognitive challenge. Its impact extends beyond psychological and physical health, affecting cognitive, social relationships, spiritual well-being, and overall life satisfaction. This study examined the influence of PTSD on perceptual reasoning among students of St. Bakhit Girls' and St. Patrick Boys' Secondary Schools in Narus, South Sudan. The objective of the study was to examine the influence of post-traumatic stress disorder on perceptual reasoning among students. The sample size was 109 students. The study had 64 males (58.72%) and 45 females (41.28%), having a ratio of 1.4:1. The mean age was 22.4 ($SD = 1.75$). Purposive sampling was used to select the study sites and simple random sampling technique was used in selecting the participants of the study. The Harvard Trauma Questionnaire (HTQ) and the Perceptual Reasoning Index were used for data collection. Data were analyzed using SPSS (version 25), and both descriptive and inferential statistics were used. The study adhered to ethical standards to safeguard the rights and well-being of the participants. The study established that PTSD is a significant predictor ($p < .001$) of Perceptual Reasoning. The study recommended that school administration should collaborate with mental health practitioners to implement regular mental health screenings to identify students who may be experiencing symptoms of PTSD.

Beyond mean scores: sex differences in literacy, numeracy, and problem-solving as intraindividual strengths across age groups

Marco Balducci, Waseen Haider

RT

University of Turku, Turku, Finland

The underrepresentation of women in science, technology, engineering, and mathematics (STEM) fields has been a longstanding issue. Traditionally, research on sex differences in cognitive abilities has focused on mean scores, which are often trivial and do not appear to explain sex disparities in STEM participation. Recently, intraindividual strengths have been proposed as a more relevant factor; they reflect an individual's relative advantage in one skill (e.g., literacy) compared with a set of related skills (literacy, numeracy, and problem-solving). Previous studies have primarily examined younger cohorts, and intraindividual strengths remain unexplored across the lifespan. In this study, we employed data from the second cycle of the Programme for the International Assessment of Adult Competencies (PIAAC) including 157,525 individuals from 30 countries to assess sex differences in literacy, numeracy, and problem-solving as intraindividual strengths across five age groups (16–24, 25–34, 35–44, 45–54, and 55+ years). Consistent with previous research, women outperformed men in literacy, while men outperformed women in numeracy. These patterns were observed universally across countries and age groups. In contrast, no sex differences were observed in problem-solving. Future research should move beyond mean scores to focus on intraindividual strengths, as they may be more relevant for understanding sex disparities in STEM.

Convergence from below or erosion at the top? Ability-segment-differentiated Flynn effects suggest a decreasing performance gap between gifted and non-gifted Austrian conscripts

Christian Becker^{1,2}, ***Alina Bugelnig***^{1,2}, ***Maria Gruber***¹, ***Alexander Birner***¹, ***Christian Langer***¹,
Martin Voracek³, ***Jakob Pietschnig***⁴ 

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Evidence suggests differentiation in generational IQ test score changes (i.e., the Flynn effect) between ability segments in the general population. However, little is known about the top two percent of the ability distribution. Moreover, current research indicates, that the Flynn effect should be investigated on the level of narrow abilities rather than broad abilities or even general intelligence. Here, we provide evidence for generational IQ test score changes in matrices, mental rotation, analogies, and synonyms performance of gifted and non-gifted Austrian conscripts ($N > 690,000$, $N_{\text{gifted}} > 7,000$) from 2003 to 2022. Cross-temporal regressions on (measurement invariant) test scores showed increases for both gifted and non-gifted individuals in analogies, mental rotations, and a matrices test, as well as decreases for both groups in two synonyms tests. In another type of matrices test, an inconsistent change pattern emerged, yielding losses for gifted but gains for non-gifted conscripts. Moreover, we observed a general narrowing of the performance gap between gifted and non-gifted individuals across time: Analogies, both synonyms tests as well as one of the matrices tests showed a significant decrease in the between-groups performance difference, ranging from -1.12 (analogies) to -5.24 IQ points per decade (synonyms). In all, our results show ability segment-dependent differentiation of the Flynn effect for gifted and non-gifted conscripts. Moreover, effects were differentiated in strength and sign according to ability domains, yielding increases in inductive reasoning, but decreases in lexical knowledge.

When imagination backfires: positive schizotypy moderates the link between creative imagination and figurative language comprehension

Andra Biesok

PP

Humboldt-Universität zu Berlin, Berlin, Germany

Figurative language comprehension (FLC) has recently been proposed as a distinct broad ability within the CHC model, yet its nomological network is only beginning to emerge. Drawing on investment-based models and dimensional accounts of psychopathology, the present study examines whether the Creative Imagination facet of Openness relates to FLC, and whether this relationship is moderated by positive schizotypy.

In a community sample ($N = 220$), FLC was modeled as a latent construct using a bifactor S-1 structure. Analyses were conducted within a Moderated Non-Linear Factor Analysis (MNLFA) framework, allowing simultaneous tests of measurement invariance and structural moderation. Two hypotheses were tested: (1) a quadratic association between positive schizotypy and the FLC latent mean, and (2) moderation of the Creative Imagination–FLC relationship by positive schizotypy.

Results showed full measurement invariance across the schizotypy continuum. As predicted, FLC exhibited an inverted U-shaped relationship with positive schizotypy, peaking at moderate levels. In contrast, the regression weight linking Creative Imagination to FLC was linearly moderated: while unrelated at low schizotypy levels, Creative Imagination became increasingly negatively associated with FLC as schizotypy increased.

These findings suggest that associative breadth—shared by Creative Imagination and positive schizotypy—can impair figurative meaning construction when not sufficiently constrained. The results highlight that openness-related traits do not uniformly facilitate complex cognition but depend on the broader regulatory context. More broadly, the study identifies a personality-by-psychopathology interaction that shapes individual differences in a proposed CHC ability, refining the theoretical positioning of FLC within intelligence research.

Advanced Placement and intellectual engagement in high school: reflections from recent high school graduates

April Bleske-Rechek, *Alexzander Russell, Lauren Kelsey, Thomas Davidsaver, Emma Smith, Carson McPherson*

PP

University of Wisconsin-Eau Claire, Eau Claire, USA

Nearly 90% of today's public high school students in the U.S. attend a high school that offers one or more Advanced Placement (AP) courses. These courses are marketed to students as a means to demonstrate their commitment to intellectual engagement, experience college-level rigor, and potentially earn college credit while in high school. In the current study, 468 college students (30% male; $M_{\text{age}} = 18.9$) from a public university in the Midwestern U.S. reported on their experiences with intellectual engagement during high school. Of those with AP courses available to them, 85% took one or more courses; the most common reason was a desire for college credit. Most students (80%) reported taking an AP exam, with pursuit of college credit a common reason for taking the exam and lack of preparation a common reason for not taking it. Of those participating in AP, 21% explicitly mentioned an AP course as their favorite class in high school. Students who participated in AP described themselves as smarter and more studious in high school than other students did (but they did not perceive themselves differently in athleticism, attractiveness, or popularity). Students who participated in AP perceived grouping students by ability as more helpful than grouping by age for intellectual growth during high school. We compare and contrast our participants' high school experiences and attitudes to those of Midwestern U.S. high school students in the 1990s (Erickson & Lefstein, 1991) and intellectually talented individuals from the Study of Mathematically Precocious Youth (e.g., Noreen et al., 2025).

Neurofunctional coupling of the insular cortex and general intelligence (g)

Oliver Bruton, Daniel Kristanto, Christiane Thiel, Andrea Hildebrandt

RT

Carl von Ossietzky Universität, Oldenburg, Germany

General intelligence (g) predicts numerous important life outcomes, ranging from academic achievement to physical health. Although well established as a heritable biological trait, theory-driven accounts of how and where in the brain g emerges remain scarce. Findings from systems neuroscience have linked g to domain-general frontoparietal control systems, as well as to their anticorrelation with the default-mode network. Precisely this interaction lies at the heart of the triple network model of cognitive control, which proposes that the salience network mediates switching between control and default-mode networks. Surprisingly, the insular cortex, considered a central component of the salience network's orchestrating function, has received little attention with respect to g .

Thus, we aimed to elucidate the association between the insula's functional connectivity profile and g by analyzing task-fMRI data obtained during a working memory paradigm in a large sample drawn from the Human Connectome Project ($N = 753$). Using regularized structural equation modeling, we identified the insular connections most relevant for g , which primarily linked the anterior insula to multimodal association networks. Notably, stronger positive connectivity between the anterior insula and control regions (e.g., the intraparietal sulcus), as well as stronger negative connectivity between the anterior insula and default-mode hubs (e.g., the precuneus), showed reliable, directionally consistent associations with g .

Interestingly, despite its prominent role in the triple network model, connectivity between the anterior insula and the anterior cingulate cortex proved only negligibly relevant for g . We discuss how the anterior insula may support g by facilitating efficient switching between higher-order networks.

Learning in reasoning: the potential in the FALT (Figural Analogies Learning Test)

*Adrian Büchli*¹, *Jens F. Beckmann*², *Stefan J. Troche*¹

PP

¹ Universität Bern, Bern, Switzerland

² Durham University, Durham, United Kingdom

Static tests, while effective, have been criticized for not capturing intraindividual variability (Tzuriel, 2021). Dynamic testing (DT) addresses this by incorporating learning opportunities to estimate potential (upper ability range). Prior research suggests that DT accounts for variance in external criteria beyond static measures (Beckmann, 2006). We examined whether this finding generalizes to a newly developed digital DT instrument, the Figural Analogies Learning Test (FALT). The FALT comprises 16 figural analogy items with prompts and learning items following incorrect responses. In a repeated measurement design, Swiss fifth- and sixth-grade students were randomly assigned to a dynamic condition (FALT at T1, 107 participants) or a static condition (static test at T1 with same 16 items; 90 participants). Two weeks later (T2), both conditions completed the static test. Mathematics grades served as the external criterion. In each condition, performances at both time points predicted mathematics grades when analysed separately (all $|\beta_s| \geq .44$). Regression models for each condition containing T1 and T2 revealed the following: In the dynamic condition, only the dynamic measure (FALT) predicted grades ($|\beta| = .47$ vs. $.09$), and in the static condition only the repeated assessment predicted grades ($|\beta| = .16$ vs. $.43$). The results in the dynamic condition indicate that the FALT captured variance beyond static assessments (possibly reflecting potential in reasoning ability). In the static condition, retest performance likely approximated this estimate of potential due to practice effects (Grigorenko & Sternberg, 1998). In summary, the findings replicate previous results and support advantages of DT in assessing intellectual change potential.

Examining the effects of political institutions on personality and intelligence: evidence from Germany and the Former Soviet Union

Nico Buettner, Colin DeYoung

RT

University of Minnesota, Minneapolis, USA

Do political institutions shape personality and cognitive ability? We examine this question using an age-cohort difference-in-differences design that exploits the historical division of Germany. Democratic market institutions in West Germany and socialist institutions in East Germany produced sharply different social environments for several decades. Following recent work in economics showing that age-cohort difference-in-differences models can mitigate endogeneity concerns in studies of German reunification (Becker et al., 2020), we compare personality traits across cohorts that spent different portions of their formative years under these institutional regimes.

Using large representative survey datasets, we find that older East Germans score lower than comparable West Germans on personality traits associated with the meta-trait Plasticity (DeYoung et al., 2006), most notably Openness to Experience. These differences decline substantially among younger cohorts who experienced more similar institutional environments. We replicate this cohort pattern in a novel cross-national dataset comparing former Soviet Union countries with Western European controls, where older cohorts in post-Soviet societies also exhibit lower Openness to Experience.

Because intelligence has been integrated into the Big Five as a core facet of Openness to Experience via its Intellect aspect (DeYoung et al., 2014), we extend our analyses to intelligence measures using multiple datasets containing both fluid and crystallized ability indicators. This allows us to test whether institutional environments shape both personality and cognitive ability, or whether intelligence remains comparatively stable while its higher-order personality traits respond more strongly to environmental conditions.

Intelligence and personality share a genetic and biological basis S

Andrew Buonaccorsi, Colin DeYoung, Dylan Maher, Tobias Edwards

RT

University of Minnesota, Twin Cities, Minneapolis, USA

There is a long-standing debate as to whether intelligence is fundamentally different from other personality traits. Twin studies have demonstrated that common genetic factors underlie intelligence and the Big Five to a weak but significant degree. Despite these findings, it is still unknown whether intelligence and personality are affected by the same genetic variants or through the same biological pathways. To remedy this, we used GWAS summary statistics for intelligence and the Big Five to examine their genetic and biological similarity in more depth. First, we reproduced their genetic correlations using LD score regression. We continued by quantifying polygenic overlap using a bivariate causal mixture model. From this we estimate that 90% of the independent SNPs affecting Big Five traits also affect intelligence. Finally, we performed gene set enrichment analysis to identify shared biological pathways that mediate genetic effects across both intelligence and personality, again finding overwhelming similarity. Using a novel measurement error adjustment, we found that gene set enrichments of intelligence correlate with those of the Big Five at approximately 1. For all six traits, gene expression is highest in the brain, particularly the prefrontal cortex. Throughout the lifespan, brain gene-expression patterns move in parallel for the Big Five and intelligence. Across each of our analyses, intelligence was as similar to the Big Five as they were to one another. On the genetic and biological level, intelligence fits in nicely with the rest of personality.

Novel and improved tests for visual abilities

Friederike Busse, Jasmin Thelen, Oliver Wilhelm

RT

Ulm University, Ulm, Germany

Established approaches for measuring visual abilities (gv) are plagued by several persistent problems. gv has poor divergent validity with fluid intelligence (gf) - They correlate close to unity with one another, and often their operationalizations are interpreted indiscriminately. Additionally, prototypical gv measures do not nearly exhaust the breadth of visual abilities that are investigated in cognitive neuropsychology for instance. In a series of studies, we want to eradicate these problems by extending the scope of gv and establishing more unequivocal and purified lower order factors of gv. In study 1 we confirmed Gauthier's factor O (object recognition) and replicated the overly high convergence between prototypical gv and gf measures at a latent level. O was weaker related with gf, relative to gv. In study 2 (ongoing) we want to replicate and extend these findings for a broader portfolio of measurements along more covariates (e.g., speed and visual short-term memory). O is measured broadly with several paradigms and stimulus classes (complex 3D figures, simple 2D shapes, faces). Moreover, gf tasks are experimentally modified to reduce the gv contribution. An overarching model for a much broader gv factor will be established. We discuss overarching strategies for improving construct coverage and discrimination in ability measurement.

Why do people have multiple mental disorders, and why do different mental disorders share common causes and consequences? Data from three nations and three generations

Avshalom Caspi

KL

Duke University; King's College London

Most etiological research on mental disorders tries to find specific causes of specific disorders, such as: What genetic factors cause schizophrenia? What altered brain morphology causes ADHD? What types of childhood adversity cause depression? However, the search for causal specificity has been elusive: mental disorders share most risk factors. One possible reason why the search for specificity has been elusive is that most disorders are more similar than they are distinct, an idea that has prompted research on p —the tendency of a person to develop a wide range of different mental disorders. The coinage p was adopted because it conceptually parallels g , the dominant dimension running through heterogeneous collections of cognitive abilities.

Here we bring together data from unique sources to provide the intergenerational and developmental empirical evidence base for understanding p . Men and women with a history of mental disorders tend to mate with partners who are also prone to have mental disorders, but not necessarily the same disorders. This creates a situation whereby their offspring, whether through genetic and/or environmental transmission, are at heightened risk of developing a variety of different mental disorders, but which specific disorder offspring ultimately develop is not easy to predict. Given that offspring receive genetic and environmental vulnerabilities to multiple different disorders, it may not surprise that people develop different disorders at different points throughout their lives. But which disorder emerges when is difficult to foretell. We discuss the implications of these findings for psychiatric nosology, for measurement and design practices in psychopathology, and for delivering more effective treatments.

Sex differences in general intelligence: Evidence from a Bayesian scale-location analysis of the Italian ICAR-16

*Leognano Ceraudo*¹, *Marco Balducci*², *Marco Tullio Liuzza*³

PP

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³ Department of Developmental Psychology and Socialisation, University of Padova, Padova, Italy

Sex differences in adult intelligence means and variances remain contested. While some studies find evidence for a small male advantage or greater male variability, others report null findings or even a slight female advantage. These inconsistencies partly reflect the methodological limitations of prior work, such as low statistical power and a reliance on observed rather than latent scores. The present study addresses these gaps by exploring sex differences in *g*-factor scores using the Italian ICAR-16. Employing a Bayesian scale-location model, we estimated both the male–female mean difference and the male-to-female variability ratio. We extended this analysis by examining whether sex differences in mean *g*-factor scores vary across economic and social conditions, proxied by Italian macro-regions (South, Centre, North). Results from the Bayesian scale-location model revealed a male advantage in *g*-factor scores ($d = 0.29$, 95% CrI [0.20, 0.38]). Nevertheless, we found no support for greater male variability. The Bayesian mixed model revealed main mean effects for both sex (males > females) and latitude (North > Centre > South), but no clear interaction between the two. These findings add to the cumulative evidence on sex differences in general intelligence while addressing key methodological limitations of prior approaches.

Human intelligence: formation and operation, a genetic theory of intelligence

Shi Cheng

PP

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Currently, there is a wide variety of research on intelligence. However, fundamental theories regarding the definition, origin, characteristics, and significance of intelligence remain unclear and have not gained widespread acceptance. The confusion of fundamental theories has directly hindered the development of research on human intelligence.

This study establishes a theoretical framework for the formation and operation of human intelligence to define basic concepts and theories for the definition, origin, characteristics, and significance of intelligence. This study consists of two parts. The first part addresses the principles of human intelligence formation. It primarily elaborates on the intelligence formation system and the intelligence system. First, based on biological gene, the intelligence formation system is constructed. Then, from the formation system, the intelligence system is constructed. In the process of constructing these different systems, the definitions, origins, characteristics, and significance of each component and related concepts within each system are established.

The part two establishes the operational principles of human intelligence. Based on intelligent systems, this section constructs a framework for intelligent operation, which reveals the interconnected and interdependent mechanisms among its various components, and establishes concepts and theories regarding the definitions, origins, characteristics, and significance of each component.

Centered on the definition, origin, characteristics, and significance of intelligence, this study conducts a comprehensive review of traditional concepts and theories, redefines concepts that are vague or misleading, and establishes a new conceptual and theoretical paradigm,

This is for my forthcoming book, *Human Intelligence: Formation and Operation*, by Shi CHENG. (ISBN: 978-1-7383223-0-5, 978-1-7383223-1-2).

Relational structures in the human brain

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Processing meaningful structured information (relational structures) has been key to defining and measuring human intelligence since Spearman. Particularly, recent research in cognitive psychology underscores the role of dealing with relational structures for interindividual variation in intelligence. However, two crucial questions remain unanswered. First, which aspect of relational structure processing does primarily contribute to intelligence level of individuals? Does such a “relational bottleneck” of intelligence consist of representing basic relational elements (binding objects to attributes), integrating them into single relations, or constructing more complex relational structures? Second, what neural mechanisms do underpin this bottleneck? I will review recent findings and models addressing these two questions. Evidence suggests that intelligence relies on the ability to represent elementary relational information, before it becomes part of more complex relational structures. This cognitive ability is supported by various neural mechanisms, including neuron complexity, structural and functional network properties, as well as brain rhythms modulation, all allowing neural processing integration across space and time. No single neural factor can explain variance in cognitive ability; only addressing concurrently multiple factors can bring us closer to understanding human intelligence and its brain substrate.

General intelligence as recursive hierarchical inferential control: a unified evolutionary–developmental framework

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We present a theory of intelligence accounting for the emergence of general intelligence in evolution and human development, substantiating the following postulates: 1) In evolution and development, intelligence varies along a dimension of complexity control enabling organisms to integrate information and action across increasingly diversified perceptual and action systems. 2) This dimension draws on a core meaning-making mechanism integrating perceptual, inferential, and awareness processes, SARA-C, (i.e., Search, Align, Relate, Abstract, and Cognize). 3) SARA-C operates as a Bayesian generative system, expanding in scope in phylogeny and ontogeny. This system iteratively updates its models of the world as new evidence arrives, building increasingly, abstract, self-aware, and self-regulated systems of understanding. 4) Eight levels are described going from reflexive control thought associative learning and hierarchical predictive control in lower-level organisms to recursive, representational, inferential, and truth control in humans and AI systems. 5) SARA-C underlies evolutionary and psychometric general intelligence, accounting for *g* emerging from tests of cognitive ability or real-life outcomes. 6) Assuming SARA-C does not imply uniformity of performance across species, individuals, and domains. Large variations may exist, depending on genetic, brain, environmental, and cultural factors, channeling the translation of SARA-C possibilities into actual learning, reasoning, and problem-solving processes, appearing as distinct Languages of Thought. Both experimental and simulation evidence will be presented supporting the model. The theoretical implications for the unification of intelligence theory across cognitive, psychometric, developmental, and artificial intelligence models and practical implications for learning by typically and atypically developing individuals are discussed.

Sex and group differences in intelligence: a meta-analysis of WISC profiles across typical and atypical development

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Whether males and females differ in cognitive abilities remains a debated issue, particularly across typical and atypical developmental populations. The present study examined sex and group differences in intelligence using the Wechsler Intelligence Scale for Children (WISC). A systematic review and meta-analysis of 169 studies ($N = 82,780$) was conducted. Results showed no consistent sex differences in general intelligence (g /FSIQ) across groups, with small boys' advantages emerging only in specific clinical populations (e.g., SLD). At the domain level, boys showed advantages in crystallized intelligence (gC) and visual processing (gV), whereas girls consistently outperformed boys in processing speed (gS) across typically developing, ADHD, SLD, and preterm/low birth weight samples. Group comparisons revealed higher performance in gifted samples and lower performance in clinical groups, particularly in processing speed and working memory. Overall, findings highlight strong similarities in general intelligence alongside domain-specific and group-dependent differences, supporting a more nuanced interpretation of cognitive profiles in both research and clinical contexts.

Collective performance: the roles of cognitive/academic ability, social-emotional factors, and group characteristics on performance in group tasks

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Drawing from prior research by Woolley et al. (2010) and Bates and Gupta (2017), an undergraduate research team and I investigated the individual and group predictors of collective task performance. We incorporated individual measures of fluid reasoning ability (Raven's APM), general cognitive ability (SAT/ACT), and academic achievement (secondary school and college grades) as cognitive/academic predictors. We measured adult temperament (ATQ) and performance on the Reading the Mind in the Eyes Test (RMET) as social emotional predictors. Group characteristics included group size, percentage of women, and percentage of group interactions in single voice (vs. multi-voice) as obtained from an analysis of audio recordings. Collective tasks included brainstorming, verbal fluency, group APM, incomplete words, and either group typing or group checkers. To date, we have collected data from 141 individuals, yielding 44 groups, ranging in size from 2-4 people, primarily in laboratory sessions. Preliminary results reveal 1) average and minimum scores on cognitive/academic variables predict group performance, 2) social emotional factors and group characteristics contribute minimally to the prediction of group performance.

Finally, I briefly discuss course-based undergraduate research experiences like this one as a means to increase engagement and interest in human intelligence research.

What's in a tilt? The differential effects of verbal and mathematical abilities on educational and economic success

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Ability tilt, the difference between two cognitive abilities (e.g., mathematical and verbal ability), has received considerable attention in the cognitive ability literature as a predictor of various outcomes (e.g., success in STEM). This concept was criticized recently by Sorjonen et al. (2022, 2023) who showed that the predictive power of tilt is spurious, in that it is due to differences in the correlations between the outcome and the tilt's components. In the current paper we suggest that despite this criticism, tilt can still be a useful concept if it is kept in mind that it represents the differential effects of its components. Although in many of the cases that were studied in the literature this differential effect is rather trivial – it is due to the similarities/dissimilarities of these components and the outcome – in other cases it may be of interest. We demonstrate this by studying the effect of tilt, as well as the effect of its interaction with general cognitive ability on educational and economic success.

Context-specific personality associations between cognitive ability and political ideology S

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The ways in which certain personality characteristics, including cognitive ability, relate to specific outcomes can be context dependent, suggesting a need to consider Context-Specific Personality Associations (CSPAs; Garner & Revelle, 2025). CSPAs refer to instances where the relationships between individual characteristics and outcomes (e.g., ideology and behavior) vary systematically across geographical contexts. Using large-scale data from the Synthetic Aperture Personal Assessment (SAPA, <https://sapa-project.org>) project ($N = 168,967$), we found that lower levels of conservative ideology were associated with higher cognitive ability ($r = -.29$) in the overall sample. However, geographic multilevel modeling showed that this negative association varied across geographic locations, ranging from relatively weak (slope = $-.07$) (in more conservative ZIP codes) to substantially stronger (slope = $-.38$) (in less conservative ZIP codes). Specifically, the association between lower Conservatism and higher cognitive ability was stronger in ZIP codes with lower mean Conservatism (adjusted $R = .12$). Cognitive ability was measured using the ICAR-60 (Condon & Revelle, 2014). We will also discuss CSPAs between political ideology and subdomains of cognitive ability, as well as with higher-order personality factors. CSPA analysis with cognitive ability and pro-environmental behaviors will be presented. Our results are consistent with Person-Environment Fit theory and Socioanalytic theory. These theories suggest that personality traits and cognitive ability help individuals “get along” and “get ahead” in ways aligned with their local context, thereby maintaining Person-Environment Fit. We will highlight the need to consider CSPAs in cognitive ability research aimed at understanding the relation between cognitive ability and outcomes.

The role of hope and motivation in emotional and behavioral outcomes among intellectually gifted adolescents

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Intellectually gifted adolescents are typically characterized by advanced cognitive and academic abilities; however, their social, emotional, and behavioral development may not always follow the same trajectory. Many gifted students experience challenges related to mental health and engagement, suggesting a need to better understand the psychological factors that support their well-being beyond intellectual ability. Among potentially malleable constructs, hope and motivation have been identified as key psychosocial predictors of adaptive outcomes in youth, yet their role in the emotional and behavioral functioning of gifted students remains underexplored.

The present study examined how hope and motivation predicted emotional and behavioral outcomes in a sample of 257 intellectually gifted adolescents. Emotional outcomes included anxiety, depression, joy, and flourishing, whereas behavioral outcomes were assessed as emotional engagement, behavioral engagement, and intellectual engagement. Linear regression analyses were conducted to assess the extent to which hope and motivation explained the variance in outcomes of mental health (e.g., anxiety, depressive symptoms) and engagement among these students.

Results indicated that hope and motivation explained 22% to 44.7% of the variance in the emotional and behavioral outcomes of intellectually gifted students beyond demographic control variables (age, gender, socioeconomic status). These findings underscore the role of psychosocial factors—particularly hope and motivation—in supporting intellectually gifted students' social-emotional and behavioral development as well as their academic growth. Implications emphasize the importance of identifying gifted students with low hope and/or motivation as at-risk and providing psychosocial interventions to promote their holistic development.

A large-scale adoption study on the intergenerational mobility of education and income

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Social inequality is often attributed to the lack of social mobility across generations. We examine intergenerational correlations in education and income, using a nation-wide, representative sample from the Netherlands. These administrative data contain precise measures of completed education and tax-record measures of individual income, for over 7,000 adoptive families and over 1,800,000 biological families. Our methodological approach allows us to estimate the direct cultural transmission of education and income from parents to offspring, controlling for genetic predisposition and assortative mating. We find little evidence for such direct intergenerational transmission. In contrast, substantial parts of the variance in social outcomes are explained by genetic endowments, as well as by the environment shared by siblings (but not parents). Heritability is larger for education compared to income, while the sibling environment contributes to both outcomes equally. Genetic and environmental contributions to education are similar between men and women, while income appears to be more heritable among women.

A-B or H-W? Are large language models reasoning or relying on learned associations?

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Whether large language models (LLMs) exhibit genuine reasoning or merely reproduce patterns learned during training remains a central question in artificial intelligence (AI) research. Notably, evaluation practices in this domain often lack the psychometric rigor that characterizes human intelligence research. Consequently, differential psychologists are well positioned to contribute to the valid assessment of AI systems using well-established approaches.

To this end, a large sample of 112 contemporary LLMs and 231 human participants were administered the Baddeley Reasoning Test (BRT). To address the problem of training data contamination, both the standard A-B version and a structurally isomorphic but novel H-W variant were used. This design permits a test of whether performance reflects pre-existing learned associations or the capacity for genuine deductive transformation.

Thirty-five percent of models performed at or near chance, whereas 65% exceeded chance levels, with 11 models achieving perfect accuracy. On average, LLMs outperformed human participants ($d = .75$). Both humans and LLMs demonstrated higher accuracy on the A-B version than on the H-W variant, with a similarly sized, small decrement in performance across groups. Moreover, LLM performance demonstrated greater cross-form consistency than human performance ($r = .92$ vs. $r = .76$).

Taken together, these findings suggest that a nontrivial subset of contemporary LLMs may be approaching genuine deductive reasoning, a pattern that was unlikely to be observed even in the recent past. I conclude by contending that the emergence of AI constitutes a watershed moment for the study of human intelligence.

Patterns, preferences, and prudence: why intelligence predicts financial success

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General intelligence is positively associated with many consequential life outcomes, including financial decision-making and investment success. However, the processes through which intelligence contributes to these outcomes remain incompletely understood. One possibility is that intelligence is associated with individual differences in decision-relevant cognitive and motivational tendencies that influence how people evaluate uncertainty, resources, and strategies. To explore this possibility, several non-cognitive to semi-cognitive dimensions relevant to economic decision-making were examined across multiple samples. First, sunk cost bias—the tendency to continue an endeavour because of resources already invested—was negatively associated with general intelligence. Second, money values, reflecting the degree to which individuals prioritize monetary outcomes, were assessed across intrinsic and extrinsic dimensions; intelligence was negatively correlated with extrinsic money values. Third, the tendency to shift to a more adaptive strategy after training on an initially successful strategy was positively associated with general intelligence, suggesting greater cognitive flexibility. Finally, apophenic thinking—the tendency to perceive meaningful patterns in random data—was negatively related to intelligence. Taken together, these findings suggest that intelligence may relate to successful investment decision-making partly through a constellation of cognitive-motivational tendencies, including reduced susceptibility to decision biases, lower endorsement of extrinsically oriented monetary values, greater strategic flexibility, and reduced pattern over-detection. More broadly, the results highlight the potential value of integrating non-cognitive dispositions into models linking intelligence with consequential real-world outcomes.

Ego in flux: fluctuations in narcissism and self-perceived intelligence across the menstrual cycle

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Narcissism is typically conceptualized as a stable personality trait, yet emerging evidence suggests that certain components of narcissism may vary across contexts and internal states. Importantly, narcissism has been linked to self-perceptions of intelligence and other agentic attributes, which may also fluctuate depending on biological and situational factors. Hormonal changes across the menstrual cycle represent one potential source of such variability.

In this study ($N = 273$), we examined whether intra-individual fluctuations in estradiol are associated with changes in narcissistic tendencies and subjective intelligence. A sample of naturally cycling women provided estradiol measurements at three key phases of the menstrual cycle. On the same days, participants completed measures of state narcissism and self-perceived intelligence. Although estradiol levels exhibited the expected cyclical variation, no direct associations were found between estradiol concentrations and either narcissism or subjective intelligence. However, both narcissism scores and self-perceived intelligence showed significant within-person variability across measurement occasions. Furthermore, subjective intelligence was positively associated with concurrent levels of state narcissism and varied significantly across the cycle.

These findings suggest that narcissism and related agentic (intelligence) self-evaluations are more dynamic than traditionally assumed. While estradiol does not appear to directly predict these psychological measures, both narcissism and self-perceived intelligence fluctuate meaningfully over time. This highlights the importance of adopting a temporal perspective in personality research and suggests that factors other than estradiol—potentially broader hormonal or contextual influences— may underlie these cyclical changes.

The genetic and environmental aetiology of spatial ability: a systematic review of quantitative genetic research

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Spatial ability encompasses the capacity to generate, retain, manipulate, and transform mental representations of objects and their spatial relationships. It is a key predictor of educational outcomes, particularly in Science, Technology, Engineering, and Mathematics (STEM subjects). Evidence from quantitative genetic research indicates that spatial ability is substantially heritable, with a proportion of this variance independent from other cognitive abilities. However, estimates of genetic and environmental influence vary across studies, suggesting potential moderation by developmental stage, measurement approach, and socio-demographic factors, as well as partly different aetiology for different facets of spatial ability. This systematic review synthesises evidence from quantitative genetic research, including twin and adoption studies, to examine the relative contributions of genetic and environmental influences on individual differences in spatial ability. Drawing on a comprehensive search strategy and narrative synthesis, the review evaluates how these influences vary as a function of age, sex, socio-demographic context, and the measures used to assess different facets of spatial ability. By integrating findings across studies, this review identifies new patterns in the developmental and contextual architecture of spatial ability and clarifies sources of inconsistency in the existing literature. In doing so, it advances understanding of the aetiology of spatial cognition and highlights key directions for future research.

The generality of intelligence heritability: a multiverse multilevel meta-analysis of twin studies

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Nature vs. nurture of intelligence and educational attainment differences have been studied for over a century. Twin studies represent one of the best means to disentangle these effects. However, heritability estimates vary across studies, with the source of this heterogeneity remaining debated. Therefore, the relative contribution of environmental variability of these genetic influences requires clarification.

The aim of the study is twofold: first, we provide a meta-analytical estimation of the heritability of intelligence and educational attainment based on the available evidence from twin studies. Second, we examine national macro-indicators as proxies of environmental factors contributing to systematic variation in these estimates. To this end, we synthesized results from 100+ twin studies ($N > 80,000$) from the published and grey literature using three common approaches to assess heritability (h^2 values, Falconer's approach, Holzinger's approach) in two-level, three-level, and multiverse meta-analyses.

Results from different estimations and analytical approaches convergently indicated larger heritabilities for intelligence (h^2 range = .50 to .62) than educational attainment (h^2 range = .41 to .47). National macro-economic indicators showed statistically significant effects on heritability estimates with higher income inequality but lower social mobility, national domestic products, and educational spending being associated with lower heritabilities. There was virtually no evidence for dissemination bias in our data.

In all, our findings indicate substantial heritabilities for intelligence and educational attainment. Importantly, we demonstrate that heritability estimates are systematically influenced by macro-level indicators of (in-)equality, supporting the context-dependent nature of genetic influences and yielding larger heritability estimates in more egalitarian societies.

History of advocacy in intelligence research (HAIR): “They accomplished much good in the world”

Leo Hesting¹

RT

¹ Association for Smarter Youth

Many individuals have both labored and achieved in the field of intelligence research, while also effectively advocating for and accomplishing social and individual good. Their stories inspire and are useful, for example when recruiting or engaging with the public.

This presentation provides an overview of the successful efforts of intelligence researchers to benefit individuals, groups, and humankind. Though varied in background, interests, expertise, outlook, and the specifics of their advocacy, their accomplishments stem from but go beyond their academic and research work.

Among others, the presentation will discuss Charles Spearman, who in 1904 reported that both laboratory and “natural” tests showed fundamental male/female equivalence in cognitive ability; Lewis Terman, who wrote that “[t]he intelligence of girls . . . does not differ materially from that of boys either as regards the average level or the range of distribution”; Leta Stetter Hollingsworth, who advocated for talented youth, women, disabled individuals, and the “minority groups” of her day; Martin Jenkins, who authored *The Case of B-: A Gifted Negro Girl*, identified and advocated for Negro/African-American high-I.Q. youth, college students, and colleges, and described the situation, characteristics, and needs of highly intelligent Negro/African-American learners while laying out strategies for serving them; and Mieczysław Choynowski, who adapted and normed the WAIS into Polish, authored the CMS or Choynowski’s Memory Scale, useful in diagnosing dementia, and defeated a Stalinist effort to erase psychometrics and the very concept of individuality.

More recent persons will also be mentioned and their efforts briefly described. Documentary evidence will be presented, generally drawn from the authors’ and researchers’ own writing, but also from historical sources and colleague testimony. The views of persons outside the field, including W.E.B. Du Bois and Martin Luther King, Jr., will be shown to be largely consonant with these and other influential intelligence researchers.

Multimethod prediction of human intelligence from structural brain connectivity

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Intelligence is a fundamental human trait impacting positive life outcomes, including educational success, health and longevity. Understanding the biological mechanisms underlying individual differences in intelligence thus constitutes a critical goal of neuroscience. Most research focuses, however, on correlative approaches with lacking generalizability or applying very rudimentary predictive methods. Moreover, while functional connectivity has been studied extensively, research on structural connectivity is still rare.

This talk will present a study in which we systematically compared different machine learning approaches to predict individual differences in intelligence from structural brain connectivity of 1,038 adults from the human connectome project. Connectome-based Predictive Modelling (CPM) and Covariance Maximizing Eigenvector-based Predictive Modelling (CMEP), which were successful in intelligence prediction from functional brain connectivity, were evaluated against two newly developed approaches based on graph regression, pretending to better account for the graph structure of brain connectivity data.

All four methods significantly predicted intelligence, while against our hypotheses, graph-based approaches did not outperform simpler prediction methods. However, combining all four methods in a multi-method stacking framework increased intelligence prediction performance markedly.

We conclude that integrating different prediction methods leverages their complementary strengths and provides a promising direction for future research on predicting human intelligence from brain imaging data.

From universal screening to educational provision: preliminary follow-up evidence on post-identification actions in Dutch primary schools

Femke Hovinga, Yvonne Cramer

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SCALIQ, Driebergen, Netherlands

Background: Universal cognitive screening can broaden identification of high-ability pupils, but the field has limited evidence on what schools do after pupils are identified and which early changes are perceived. Building on the (Un)Identified study—large-scale universal screening in Dutch primary education—we examined post-identification educational responses and school-reported outcomes.

Methods: We collected follow-up reports from Dutch primary schools on pupils newly identified via screening in two norm-referenced ability bands based on national norms (top 20% vs top 5%). Schools reported educational provisions implemented and perceived changes in academic results and well-being from student, parent, and teacher perspectives. Analyses are descriptive and preliminary; data collection is ongoing.

Results (preliminary): In a subset of 48 schools, enrichment/compacting was the most frequently reported response (top 20%: 88%; top 5%: 77%), followed by access to a pull-out enrichment group (33% vs 54%). Acceleration was infrequent (4% vs 10%), and 19% vs 13% reported no specific intervention. Schools most often reported no change in results (73% vs 79%). Reported well-being increases were more often linked to interventions following identification (students: 60% vs 65%). Common student-reported reasons were feeling seen/heard (82% vs 86%), less repetition (53% vs 67%), and increased ownership (44% vs 50%).

Conclusion: Early follow-up suggests schools primarily respond with classroom enrichment and, less often, pull-out provision; perceived academic changes appear modest while perceived well-being improvements are frequently reported. Ongoing work will test robustness and examine how school-level decision rules and capacity constraints relate to provision choices and reported outcomes.

Who gets identified as high ability? Demographic predictors of teacher recognition after universal screening

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Background: Teacher nomination is a common route for identifying high-ability pupils, yet nomination may be systematically biased. The (Un)Identified study examined who becomes “visible” to schools when objective screening data are available.

Methods: Pupils in Dutch primary schools ($N \approx 5,371$) were screened using an adaptive, non-verbal cognitive screener designed to minimize linguistic and cultural bias. Teachers reported whether they suspected giftedness, alongside demographic indicators (sex, relative age/birth month, socioeconomic indicators, second-language status, and migration background). We examined alignment between teacher recognition and screened cognitive potential using weighted descriptive statistics and logistic regression models that accounted for screened cognitive potential.

Results: Teacher suspicion was reported for 16.2% of pupils (weighted). From the “high-ability pupil” perspective, teacher recognition reached 29.7% of pupils in the 80th–95th percentile band (70.3% not flagged) and 47.6% of pupils at or above the 95th percentile (52.4% not flagged). Evidence of over-identification relative to screened cognitive potential was also present: among teacher-flagged pupils, 54.2% scored below the 80th percentile. In regression models, girls had lower odds of being flagged than boys ($\approx 43\%$ lower), later birth month reduced odds ($\approx 4.4\%$ per month), low SES/disadvantaged environment reduced odds ($\approx 38\%$), and second-language status reduced odds ($\approx 25\%$).

Conclusion: Teacher nomination both under-identifies a substantial share of cognitively strong pupils and shows systematic demographic gradients, while also flagging many pupils who do not score in high percentiles on screening. Findings support universal screening plus transparent, bias-aware decision rules to improve equity and precision in access to advanced learning opportunities.

Lapses during a speeded number-comparison task may be indicative of a meta-cognitive performance monitoring mechanism

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We examined whether cognitive ability predicts the frequency and dynamics of attentional lapses—extreme reaction-time slowdowns—in a speeded number-comparison task. In a sample of 770 undergraduates, lapses were defined using a person-relative approach as correct trials with reaction time (RT) exceeding the individual's median by more than 3x the subject-level median absolute deviation. Higher scores on the ICAR-16, a short-form measure of general intelligence (g), predicted fewer lapses even after controlling for typical (non-lapse) response speed ($\beta = -0.169, p = .016$), and this association was robust across alternative lapse thresholds. The protective effect of cognitive ability was strongest among faster baseline responders. Peri-lapse analyses revealed that lapses are not isolated events: error probability and RT both escalated over the 10 trials preceding a lapse, consistent with gradual attentional drift. Following a lapse, accuracy improved sharply (error OR = 0.48) while RT remained elevated but recovered over several trials, suggesting compensatory recalibration. None of these peri-lapse dynamics were moderated by ICAR-16 scores. We propose that lapses reflect a performance-monitoring mechanism—unrelated to g —that detects degraded performance and initiates corrective adjustments.

Uncovering the latent organization of brain white matter microstructure and its link to fluid intelligence

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Individual differences in fluid intelligence are thought to partly reflect variation in the efficiency and fidelity of neural information transfer, with white matter microstructure as a key candidate substrate. However, associations between MRI-derived microstructural indices and intelligence are often attenuated by measurement error, obscuring their true magnitude. To address this challenge, we derived the latent organization of white matter microstructure to obtain more reliable estimates of its association with fluid intelligence.

We analyzed data from $N = 365$ healthy adults (18–74 years) drawn from two independent samples (Dortmund Vital Study: $N = 150$, Clinicaltrials.gov: NCT05155397; Mainz Network Study: $N = 215$). Across markers of white matter integrity (fractional anisotropy, FA), neurite density (intra-neurite volume fraction, INVf), and myelin content (magnetization transfer ratio, MTR), systematic model comparisons supported similar hierarchical bifactor structures. All models comprised a dominant general factor alongside orthogonal hemisphere-specific components, indicating that these MRI-derived indices primarily capture brain-wide properties.

Critically, the general factors of FA and MTR showed significant positive associations with a latent variable of fluid intelligence (FA: $\beta = 0.26$, $p < .001$; MTR: $\beta = 0.25$, $p = .017$). When controlling for age, only the association with FA remained significant ($\beta = 0.14$, $p = .043$). These findings suggest that brain-wide variation in white matter integrity is meaningfully related to individual differences in fluid intelligence and highlight the potential of psychometric modeling of neuroimaging data for identifying the neurobiological foundations of cognitive abilities.

The intelligence–creativity nexus revisited: insights from the Warsaw Study

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KL

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The relationship between intelligence and creativity remains one of the most enduring and contested questions in differential psychology. While intelligence consistently predicts educational and occupational attainment, its role in shaping creative achievement is more controversial. This keynote revisits the intelligence–creativity nexus using evidence from the Warsaw Study: a large-scale longitudinal investigation following a cohort of individuals from late childhood into midlife across more than four decades of profound sociocultural and economic transformation in Poland. The Warsaw Study offers a unique opportunity to examine how childhood cognitive ability relates to later creative accomplishments, educational trajectories, occupational outcomes, and subjective indicators of adult functioning. Drawing on both published and unpublished analyses, this presentation will explore several questions: (a) whether intelligence is linearly associated with creative achievement across the lifespan, (b) whether threshold-like or necessary-condition-like effects emerge for different domains of creativity, (c) how socioeconomic background moderates long-term developmental trajectories, and (d) which combinations of cognitive ability and contextual factors best predict eminent versus everyday creativity. By integrating psychometric, developmental, and sociocultural perspectives, the talk aims to provide a nuanced account of when intelligence supports creativity, when it does not, and why the relationship remains more complex than many classic theories anticipated.

Attentional control as a foundation for cognitive development

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This study examined whether intensive training in attentional control enhances performance and promotes transfer to broader cognitive abilities in typically developing children aged 5–7 years ($N = 155$). Participants completed 30 training sessions targeting representational flexibility, perceptual inhibition, and conceptual inhibition, while also providing ongoing self-evaluations of their learning. Cognitive performance in working memory, relational integration, fluid and mathematical reasoning, language, and metacognitive awareness was assessed at three time points. Data were analyzed using hierarchical structural equation modeling, latent growth modeling, and mediation analyses to capture both learning dynamics and transfer mechanisms. Latent growth modeling indicated substantial improvements in the trained processes, characterized by rapid gains during the initial phase of training followed by a deceleration over time. Self-evaluative judgments became progressively better calibrated with actual performance. No direct transfer effects were observed from improvements in attentional control to reasoning and language outcomes. Instead, gains in attentional control, together with increased accuracy in self-evaluation, contributed to enhanced relational integration, which in turn supported the development of metacognitive awareness. Relational integration and awareness emerged as key mediating mechanisms in the transfer of learning to reasoning and language outcomes. These findings support developmental models positing that attentional control contributes to higher-order cognition indirectly, through core meaning-making processes linking control, integration, and awareness, thereby refining theoretical accounts of the emergence of general intelligence in early childhood.

The Garfield effect: how time of day and day of week influence performance on cognitive ability tests in teenagers

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The Woodcock-Johnson IV Tests of Cognitive Abilities (WJ-IV-COG) were standardized in Hungary using a nationally representative sample of 1,319 children aged 6–18 years. As part of the procedure, the time and date of administration were recorded, enabling examination of time-of-day and day-of-week effects on cognitive test performance across seven CHC broad abilities: Gc (Comprehension-Knowledge), Gf (Fluid Reasoning), Gwm (Working Memory), Gs (Processing Speed), Ga (Auditory Processing), Glr (Long-Term Retrieval), and Gv (Visual Processing). Age groups were defined to reflect the established chronobiological shift from morningness to a later circadian rhythm, which occurs around age 15. In the total sample, neither time-of-day nor day-of-week effects were detectable. However, this null result masked opposing age-specific patterns: 12–15-year-olds performed better with earlier start times, whereas 15–18-year-olds showed the reverse trend, performing better with later administrations. A similar opposing effect emerged for day-of-week, but only on Mondays: 12–15-year-olds performed better on Mondays than on other days of the week, while 15–18-year-olds performed worse. This effect was substantial enough that, for Working Memory, Fluid Reasoning, and Auditory Processing, 12–15-year-olds outperformed 15–18-year-olds on Mondays—but not on other days of the week. For the remaining four abilities, no significant age-group differences appeared on Mondays, but the expected age patterns held on other days. These findings highlight circadian and weekly influences on cognitive ability testing and support age-specific scheduling.

The cognitive complexity–openness hypothesis revisited: disentangling the role of intelligence and personality for political orientations

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The relations between intelligence and political orientations have been widely discussed. In several studies, higher intelligence was associated with more liberal and less conservative political orientations (e.g., Deary et al., 2008), whereas other findings suggested more nuanced patterns across political orientations. According to the Cognitive Complexity–Openness Hypothesis (Van Hiel et al., 2010), political orientations are shaped by a joint product of cognitive ability and openness to experience. Accordingly, the cognitive resources for processing complex political information are provided by intelligence, whereas openness reflects the motivational willingness to deal with ambiguity and novelty. However, empirical tests of the interaction assumption remain limited.

To examine their interplay in predicting political orientations, we assessed intelligence and openness with established instruments in German university students ($N = 542$; 65% female; mean age = 21.0 years). Furthermore, we measured multidimensional political orientations (economic libertarianism, liberalism, conservatism; socialism; Ulrich, 2021) and a left–right self-placement scale. Hierarchical regression analyses with interaction terms (intelligence $\times$ openness) were conducted for each outcome, controlling for age and sex.

Intelligence and openness were largely independent ($r = .08$). Correspondingly, intelligence and openness showed independent effects. Intelligence predicted lower economic libertarianism and conservatism, whereas openness emerged as the numerically strongest predictor across political orientations. For the five political orientations, the interaction term did not differ significantly from zero, providing no support for the corresponding Cognitive Complexity–Openness Hypothesis. These findings suggest that openness may structure general political orientations, whereas intelligence may influence more specific political preferences.

A meta-analysis of the Bennett Mechanical Comprehension Test: specific ability in a work domain

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This meta-analysis examines the correlations between the Bennett Mechanical Comprehension Test (BMCT) and overall job performance, specific ratings of job performance, overall training success, academic success and other measures of human cognitive abilities. Data were coded from 39 studies. Consistent with models of human abilities, mechanical ability was strongly correlated with general mental ability (GMA) and very strongly correlated with spatial abilities. Mechanical ability exhibited strong correlations with overall ratings of job performance ($r = .267$, $\rho = .43$, $k = 33$, $N = 5,556$) for mechanically focused jobs. When supervisory ratings specifically focused on the mechanical skills, the correlations were larger ($r = .36$, $\rho = .57$, $k = 12$, $N = 746$). Jobs were split using job analysis data into moderate and high complexity jobs. Consistent with research on GMA, the BMCT correlations with job performance were greater when jobs were more complex. For academic and training outcomes for mechanical jobs, the meta-analytic estimates were universally strong. Finally, 6 studies contained information to allow examining the incremental validity of the BMCT over general cognitive ability for predicting job performance in mechanically focused jobs. On average, the $\Delta R = .15$ indicated improved prediction when mechanical ability was used in the prediction of these mechanically focused jobs.

Recent human evolution

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We review what DNA recovered from hominin remains has revealed about the course of human evolution over the past 50,000 years. Because of the unevenness with which ancient DNA has been sampled from across the world so far, we concentrate mainly on events in western Eurasia. Modern humans left Africa for Eurasia at the beginning of this time period, and their migration differed from previous ones in that one branch admixed with archaic hominins—most critically Neanderthals—and subsequently became the sole extant hominin lineage in Eurasia. About 10,000 years ago, agriculture was invented in the Fertile Crescent, and humans had to adapt by natural selection to this profound change in their means of subsistence. Tracking of allele frequencies over time reveals adaptation with respect to disease susceptibility, pigmentation, and behavioral traits such as intelligence.

Do communal narcissists care about intelligence? Associations with high self-assessed and low objective intelligence

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Communal narcissism reflects a tendency to enhance oneself in the communal domain. However, research suggests that the underlying self-motives in communal narcissism (e.g., maintaining a grandiose self-image) are not exclusively communal, but also agentic. In this study, we examined the relationship between facets of grandiose narcissism—agentic and communal— and an inherently agentic attribute: intelligence. Across two independent samples ($N_1 = 211$, $N_2 = 311$), both communal and agentic narcissism were positively associated with subjective (self-rated) intelligence. While agentic narcissism showed no relation to objective intelligence, communal narcissism was negatively associated with it. Additionally, both forms of narcissism predicted an overestimation of objective intelligence.

Are smarter brains always faster? Testing the boundaries of the mental-speed hypothesis S

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In this work, we examine the neurocognitive foundations of intelligence by probing the limits of the mental speed hypothesis at the level of distinct cognitive processes. While prior research has consistently demonstrated strong associations between intelligence and mental speed in standard response-time paradigms, recent findings (Sadus et al., 2025) challenge this view by showing no such relationship for encoding speed in a working memory task lacking explicit decision or response components. These results raise important questions about the generality of the mental speed hypothesis.

Using a general-population sample ($N = 200$), the present work systematically investigates whether associations between mental speed and intelligence extend across encoding-, decision-, and response-related processes. Event-related potential (ERP) latencies are used to isolate the temporal dynamics of these processes. Specifically, we test whether the speed of encoding or response-related processes as measured by ERP latencies alone can predict intelligence, or whether the presence of decision-related processes is necessary for the speed–intelligence relationship to emerge.

The findings provide critical insights into the process-specific nature of mental speed and its role in intelligence, refining current theoretical accounts and informing the future scope of the mental speed hypothesis.

A Flynn effect for executive functioning: evidence for domain differentiation in three distinct tests in Austria

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Cross-temporal IQ test score changes (the Flynn effect) have been shown to be differentiated between specific cognitive domains, however little is known about change trajectories in executive function tests. Here, we investigated change trajectories in test performance on three well-established tests of executive functioning testing concentration, interference management, and sustained attention in adults in Austria between 2000 and 2025 by means of a norm-comparison design. We compared test performance in three population-representative archival standardization samples tested between 2000 and 2004 (N range 221 to 327) with test performance of demographically matched purposefully recruited participants in 2025 (N range 221 to 327). Change trajectories were differentiated according to examined domain, albeit small in strength, yielding improvements in concentration ($d = 0.12$), stagnation in interference management (all $|d| < 0.06$), and declines in sustained attention ($d = -0.27$). Additionally, multiple indicators of test accuracy across test instruments showed evidence for small improvements (d range = 0.01–0.27). Our results indicate that (i) there appears to be a Flynn effect at least for certain executive functions and (ii) these changes appear to be differentiated according to specific domains.

Beyond odor identification: an unexpected association between olfactory threshold and cognitive abilities

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Olfactory dysfunction might be an early marker of neurocognitive decline. However, many studies rely on odor identification tests, in which participants identify an odor from a set of alternatives. Performance on these tasks may partly depend on lexical-semantic abilities related to general cognitive ability (GCA).

We tested whether odor identification predicts GCA after controlling for odor discrimination and odor threshold, which are generally considered less cognitively demanding. Data were collected from 266 participants (214 women; mean age = 25.81 years, $SD = 13.40$). Olfactory function was assessed using the extended Sniffin' Sticks Test, including odor threshold (OT), odor discrimination (OD), and odor identification (OI).

Cognitive abilities were assessed using a semantic fluency task (FAS), the Cognitive Reflection Test (CRT), and the 16-item International Cognitive Ability Resource (ICAR-16), including Verbal Reasoning, Matrix Reasoning, Letter and Number Series, and Three-Dimensional Rotation.

We found no evidence that OI was more strongly associated than the other olfactory measures with any cognitive outcome, either in zero-order correlations or in regression models controlling for OT, OD, age, sex, and education. In exploratory analyses, however, OT showed a significant incremental association with Matrix Reasoning ($\beta = 0.14$, $p < .05$).

These findings may reflect the fact that none of our cognitive measures directly assessed vocabulary knowledge. In addition, although OT is primarily sensory, it may also require attentional resources overlapping with fluid cognitive abilities. These interpretations should be treated cautiously given the exploratory nature of the analyses.

What if we could measure how fast we are aging while we are still healthy? Cognitive health and the pace of aging

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This lecture will answer questions such as the following: How did we follow 1,000 people for 50 years to build a tool to measure the pace of aging? What kinds of functions of the body and brain are tested to assess the pace of aging? What is an aging clock, and how does it work? How do we know the difference between fast aging and simply being sick? Will people who are aging faster die younger? What aspects from early life, including cognitive health and intelligence, lead to faster aging? Does a fast pace of aging predict risk for mild cognitive impairment and dementia? Will an aging clock slow down if we take medications or make lifestyle changes? Do aging clocks work in different ethnic groups? Can pace-of-aging scores be normed like IQ scores? What can a pace-of-aging measure be used for in health care? How is an aging measure valuable to “the longevity industry”?

Mismatch negativity and general cognitive ability: a meta-analysis

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Intelligence or general cognitive ability (GCA) is fundamental to human behaviour and cognition. It impacts important life outcomes like educational success and even health and longevity have been related to differences in GCA. Understanding the biological basis of such individual variations presents a crucial goal of neuroscience. The mismatch negativity (MMN) is an event-related brain potential that can be measured when within a series of frequent standard stimuli rare deviants are presented and is suggested to reflect conscious (active) or unconscious (passive) detection processes of the brain. Importantly, variations in MMN amplitude and latency have been linked to differences in GCA. Yet findings in this field vary considerably. This preregistered meta-analysis provides a comprehensive and structured overview of the current state of research. Following the study selection process in accordance with the PRISMA guidelines, and the rating of study design quality with the Study Design and Implementation Assessment Device for Individual Difference Research (DIAD-ID), the association between GCA and MMN amplitude and latency was examined in 695 healthy adults across 13 included studies. The estimated across-sample associations between MMN and GCA were small, but significant (MMN amplitude-GCA: $r = -0.08$, MMN latency-GCA: $r = -0.13$; $p < 0.05$) and moderators were identified. Between-sample heterogeneity was moderate, with no evidence of publication bias. Our findings suggest that higher intelligence is associated with slightly stronger and faster MMN responses. However, the low estimated across-sample effect sizes and the small number of included studies also highlight the need for more research.

How do multimodal large language models perform on a standardized intelligence test battery? A psychometric comparison with human data

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Large language models (LLMs) perform remarkably well across a wide range of cognitive tasks, raising the question of whether artificial intelligence (AI) performance maps onto the psychometric structures of human intelligence. Here, we examined this using the Inventory for the Assessment of Cognitive Abilities (INT), a standardized intelligence battery comprising four subtests (logical, numerical, verbal, and visuospatial abilities). The INT was selected because it is not publicly available, thereby reducing the likelihood of training-data contamination. The test was administered to a human normative sample collected in 2023 ($N = 614$; $M_{\text{age}} = 50.21$; 55% female). We generated data from three open-weight multimodal instruction-tuned models, using identical test instructions and response format as in the human administration. Each model completed the INT in 614 context-independent runs. In the human sample, Rasch homogeneity was established. Across three LLMs, however, we found no evidence for Rasch homogeneity, unidimensionality, or a positive manifold. Against our expectations, LLM performance was weak, particularly in logical and numerical reasoning tasks. Importantly, model accuracy was negatively associated with item difficulty established in the human standardization sample, indicating partial ability convergence at the item level despite the apparent absence of a superordinate ability stratum in LLMs. Our results indicate that task performance alone is insufficient evidence for a human-like psychometric architecture, challenging the assumption underlying human psychometric frameworks in LLMs. Furthermore, we highlight that claims about a human-like positive AI-manifold may depend critically on the model class under investigation, including potential differences between open instruction-tuned and closed proprietary models.

Beyond g: tilt super-residual projection traces are non-additively heritable and non spurious

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Tilt proponents have argued that tilts predict criteria (GPA, test scores, occupational outcomes, etc.) and are heritable, indicating that they have validity above and beyond g. Skeptics have asserted that this quality of tilts is exclusively due to the narrow abilities that go into their estimation, and not the tilt per se. Proponents have countered with the observation that even when tilts' associations with their specific abilities are statistically controlled, tilts retain meaningful behavior-genetic variance components (exhibiting strong signals of shared environmentality) and are related to criteria (such as life history speed). Skeptics have countered with the observation that these findings are a spurious product of age controls.

Here this question is revisited with the Georgia Twin Study, where it is found that dropping the age control from heritability estimates of tilt super-residuals (i.e., projection traces controlled for both g and all constituent subtest scores) allows for the recovery of a Falconer-bounded behavior-genetic architecture characterized by signals of genetic non-additivity (D), in four of the six tilt projection traces. Crucially, the Falconer-bounded rMZ - rDZ value across the six projection traces (0.328, bounded h^2 mean = 0.540) was found to be significantly larger (in favour of rMZ) compared to the results of a Monte Carlo simulation involving 5,000 iterated projection traces constructed from combinations of real twin data and random numbers ($p=.0002$), and employing four different null tests (singleton permutation pool, empirical resampling, Gaussian pseudo-co-twin, and independent marginal).

Systematic effects of prosperity and equality on sex differences in PISA, TIMSS, and PIRLS assessments: within-country effects, between-country effects, or both?

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Sex differences were frequently observed in the results of international large-scale student assessments such as PISA, TIMSS, or PIRLS. National macro-indicators such as prosperity have been linked to these differences, yet it remains unclear whether these associations are a consequence of between- or within-country variation. Here, we examined the influences of national prosperity, educational spending, equality, and their interactions with within-cohorts prosperity on sex differences in data from 90+ countries from PISA (2000–2022; $N = 2,000,000+$), TIMSS (1995–2023; $N = 770,000+$), and PIRLS (2001–2021; $N = 490,000+$). Girls outperformed boys in reading literacy, whilst boys outperformed girls in mathematics and science. Regression analyses showed negative associations between reading literacy sex differences and national prosperity as well as income inequality, but positive ones with educational spending. Thus, sex differences were smaller in more prosperous countries, but larger in more egalitarian countries, which are investing more in education. For mathematics and science, higher national prosperity and educational spending yielded larger advantages for boys, particularly in TIMSS cohorts. Importantly, there was some evidence for larger influences of prosperity and equality in the lowest socio-economic strata within countries. In all, our findings indicate that associations between national macro-indicators and sex differences are differentiated according to domain and effect direction. Contrasting effects of national prosperity in domains that typically yield advantages of girls vs. those that yield advantages of boys may point to greater male sensitivity to environmental conditions, consistent with our findings that these effects were strongest in the lowest within-country socioeconomic strata.

As intelligent as a narcissist? Bidirectional relations between narcissism and intelligence in a daily diary study

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Narcissism, conceptualized as an entitled sense of self-importance, is a multidimensional construct comprising three qualitatively different facets: agentic (i.e., self-promoting self-enhancement), antagonistic (i.e., hostile self-protection), and neurotic (i.e., hypersensitivity and withdrawal). Although neither of these is related to objectively assessed intelligence, there is robust evidence that one particular facet, namely agentic narcissism, is associated with greater propensity to overestimate one's own intelligence—that is, subjectively assessed intelligence (SAI). Within the current 30-day long daily diary study ($N = 317$; $k = 8,220$ responses), we examined not only how narcissism facets are related to mean levels of SAI, but also whether temporary changes in narcissism and SAI are related to one another. Results of the dynamic SEM models revealed that on average, agentic narcissism is positively related and neurotic narcissism is negatively related to the mean SAI. Whereas SAI level was related to lower variability in SAI and narcissism states during the course of the study, all narcissism facets were related to increased variability in themselves and SAI. Finally, only the daily increases in agentic narcissism beyond personal average were related to successive decreases in SAI on the next day (but not vice versa). These results provide robust evidence for how narcissism is related to SAI over time.

Predicting didactic and clinical performance using the Dental Admission Test

S

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The purpose of this meta-analysis was to systematically analyze the relationship between the Dental Admission Test (DAT) and various measures of performance in dental school such as didactic performance, course GPA, pre-clinical course GPA, and the National Board Dental Examination (NBDE). While there are many components in learning and skill acquisition, cognitive ability is a crucial determinant of these processes (Kanfer & Ackerman, 1989; Ackerman, 1992). It is therefore a chief concern that this ability is predicted by the DAT in order to select for dental students that will best learn dentistry skills and develop professional expertise (Ackerman, 2003). PUBMED and Google Scholar databases were searched with the goal of identifying the relationship of the DAT to any performance measure throughout dental school. 23 studies were included. Meta-analysis showed that all subscales were positively correlated with grades in Dental School with Academic Average and Total Science subsections demonstrating consistently the strongest correlations. Only a few studies examined year 3 & 4 grades and neither Academic Average or Perceptual Ability were strongly correlated. Academic Average and Total science were strong predictors of NBDE Parts 1 and 2. Overall, the results demonstrate that the DAT is most strongly correlated with the first two years of dental school, but declines in predictive power when the focus moves to later clinical courses. The DAT appears to have utility for predicting many but not all measures of dental student performance. Finally, the overall literature was comparatively thin given the importance of selecting and training dental students.

The value of critical thinking: a meta-analysis

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The purpose of this meta-analysis is to better determine the construct validity of critical thinking (CT), which helps inform the question of whether teaching CT in higher education is worth the allocation of resources. CT has been identified as a key characteristic by employers and in reports on 21st-century workforce skills (National Research Council, 2012). Research has demonstrated that college students gain in critical thinking (Huber & Kuncel, 2016) but have called into question the importance and independence of CT from general cognitive ability. We screened 3,387 papers across the outcome variables of GPA, cognitive ability, job performance, rationality, personality, and superstitions, of which 168 papers were included for analysis. Preliminary analyses indicate that CT skills have a moderate relationship with GPA ($r = .22$, $k = 73$, $N = 14,814$) and a stronger relationship with job performance ($r = .31$, $k = 16$, $N = 2,867$). CT dispositions show a slightly weaker relationship with GPA ($r = .16$, $k = 25$, $N = 9,225$) but a stronger relationship with job performance ($r = .39$, $k = 4$, $N = 482$). Finalized results will be presented including appropriate meta-analytic results and moderator analyses. This meta-analysis will help to better situate the construct validity of critical thinking measures by establishing their correlations with other individual difference measures and real-world behaviors. This meta-analysis will also help determine whether CT should be a focus of both selection for work and higher education as well as the value of teaching critical thinking in school.

Contributions of fluid intelligence and working memory to metacognitive control and learning outcomes S

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Fluid intelligence (FI) and working memory (WM) are well-established predictors of learning outcomes. Recent research highlights the additional role of metacognitive control, the ability to strategically regulate learning (e.g., making restudy decisions) based on self-monitoring. Although FI and WM are related to metacognitive control, their joint contributions have not been examined. It remains unclear whether they explain variation in metacognitive control, whether they are indirectly linked to learning through it, and how each uniquely predicts learning outcomes. The present research addressed these questions with approximately 250 adolescents ($M_{\text{age}} \approx 13$). Participants learned school-related concepts, completed self-tests, monitored confidence in their responses, and made restudy decisions. They also completed three WM tasks and a short form of Raven's Standard Progressive Matrices. Structural equation modelling is used to examine relations among cognitive abilities, metacognitive control, and learning outcomes. Preliminary path analysis, excluding the third WM task and using learning task performance, not school grades, as the outcome, showed that WM and FI were positively related. FI, but not WM, uniquely predicted metacognitive control ($\beta = .23$). In addition, WM ($\beta = .18$), FI ($\beta = .35$), and metacognitive control ($\beta = .40$) predicted performance, explaining 44% of the variance. FI also showed a small indirect effect on performance via metacognitive control. These findings underscore the role of FI and metacognitive control in learning, whereas WM appeared less influential when accounting for other abilities. Full analyses, including all WM tasks and grades, will be presented at the conference.

From neural noise to cognitive architecture: a formal model of why abilities covary and why they covary differently across individuals

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KL

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Cognitive abilities covary positively, yet after a century of research we lack a formal model that explains why from mechanism, let alone one that asks whether this covariance structure is the same in everyone. I present such a model. Starting from a single, neurally grounded parameter — the fidelity with which the cognitive system processes information — I show how processing precision constrains the binding of features in working memory through three formally specified pathways: encoding precision, consolidation rate, and retrieval discriminability. When run across a battery of cognitive tasks, each characterized by theoretically derived demand profiles, the model generates the covariance structure of abilities as an emergent consequence: the positive manifold falls out without being assumed. The model meets benchmark findings any mechanistic theory of intelligence must explain, including the speed-ability relationship, the centrality of working memory capacity, and ability differentiation, and generates novel predictions no existing framework makes. Critically, making processing fidelity time-varying within individuals transforms the model from a between-person account into a person-specific one: fluctuations in processing fidelity over time produce within-person covariance structures that constitute individual cognitive architectures. Two people with identical average fidelity but different temporal dynamics are predicted to have qualitatively different architectures, which has direct implications for how we measure, model, and intervene on cognitive ability. I present the formal framework, evaluate its predictions, and discuss what it means for the field if the positive manifold is a population-level shadow of fundamentally individual cognitive systems.

Cognitive predictors of school performance from preschool to primary school

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This study investigated the relations between executive, relational, reasoning, and awareness processes, on the one hand, and school performance in language and mathematics from preschool to sixth primary school grade, on the other hand. Children from kindergarten to sixth grade ($N = 401$) were examined by attention control, working memory, relational integration, and Raven-like matrices. Teachers' evaluations of learning ability and actual performance in language and mathematics were obtained. A series of structural equation models showed that, when examined alone, each process predicted academic performance significantly. When all processes were included in a common model, the profile of predictors varied significantly with school level: executive processes and relational integration dominated in preschool; Raven-like reasoning and cognizance dominated in primary school. Theoretical and practical implications are discussed.

How intelligence translates to successful complex problem solving: the mediating effect of the effective strategic behavior VOTAT

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More intelligent individuals are typically more successful in achievement-related tasks than less intelligent individuals. However, little is known about interindividual behavioral differences while working on achievement-related tasks. Scenarios assessing Complex Problem Solving (CPS) allow to assess the problem-solving process while exploring yet unknown CPS items (e.g., the domain-general VOTAT-strategy; vary-one-thing-at-a-time) and CPS-achievements. In adolescents, intelligence and CPS-achievements were closely correlated. Furthermore, the intelligence-CPS relationship was significantly mediated by optimal strategic behaviors like VOTAT (e.g., Lotz et al., 2022). Notably, there is a lack of CPS assessments in elementary schoolchildren. Furthermore, elementary schoolchildren have typically not been fostered in effective strategies to explore new tasks in school.

Therefore, we developed an instrument to assess CPS in elementary schoolchildren based on an approach established in adolescents. We hypothesized that intelligence and CPS-achievements were significantly correlated, that VOTAT was significantly related to intelligence and to CPS-achievements, and that VOTAT mediated the relationship between intelligence and CPS-achievements. In 467 German third- and fourth-graders, we assessed intelligence in the sense of figural reasoning (Weiß, 2006) and CPS with the new instrument.

Results revealed promising evidence regarding the new CPS test assessing the two expected dimensions (information retrieval [VOTAT]/model building [CPS-achievements]): e.g., reliability ($\alpha = .77/.87$) and factorial validity. Furthermore, intelligence correlated with CPS-achievements ($r = .54$). VOTAT correlated also with CPS-achievements ($r = .83$) and intelligence ($r = .52$). Finally, the strategic behavior VOTAT mediated the intelligence-CPS-achievements relation (indirect effect: $\beta = .40$). In the discussion, we will focus on the importance of strategic behaviors for clarifying the mechanism how intelligence translates to achievements.

Perceptions of a partner's intelligence are fallible and liberally biased: evidence from romantic dyads

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Intelligence is a valued trait in long-term romantic partners, yet it remains unclear how well individuals can assess a current partner's intelligence, and whether such inferences are biased toward inferring above-average intelligence. In the present study, both members of 102 heterosexual couples ($N = 204$) completed the 16-item International Cognitive Ability Resource (ICAR) and provided ratings of their own and their partner's intelligence on a scale from 1 (extremely low) to 7 (extremely high). In all four conditions (women's self-perceptions, women's partner-perceptions, men's self-perceptions, men's partner-perceptions), intelligence scores were not associated with intelligence ratings, indicating a disconnect between perceived and actual intelligence. Dichotomized intelligence scores and intelligence ratings (above average vs. average to below average) were then analyzed using a signal detection approach to estimate discriminability (d') and bias (c). In all four conditions, the ability to discriminate between above- and below-average intelligence did not exceed chance performance. However, all four conditions revealed a liberal response bias, reflecting a tendency to classify targets as above average in intelligence. An omnibus model further revealed an effect of target (self vs. partner) on bias, such that biases were more liberal when judging the intelligence of a partner relative to the self. Neither bias nor discriminability was influenced by perceivers' intelligence scores. These findings suggest that the ability to assess one's own or a partner's intelligence is limited, and under such uncertainty, individuals are biased toward inferring above-average intelligence in both themselves and, especially, their partners.

How midfrontal theta power and fronto-parietal theta coherence change across item difficulty levels

Nicolas Staufer-Keller, Stefan J. Troche

PP

University of Bern, Bern, Switzerland

Midfrontal theta power (MFT) has been proposed to be a psychophysiological index of cognitive control, while fronto-parietal theta coherence (FPTC) may indicate the coordination of cognitive control (Cavanagh & Frank, 2014; Sauseng et al., 2005). As cognitive control is assumed to influence reasoning ability (Engle, 2018), the present study aimed to examine whether theta activity increases during logical reasoning and varies with the difficulty of reasoning items, i.e., with the amount of required cognitive control. 53 female participants completed 20 reasoning items categorised into three difficulty levels while the electroencephalogram was recorded. MFT and FPTC increased from the resting state to the active reasoning state. In contrast to our expectations, FPTC decreased significantly from the easiest to medium and from the medium to the difficult level. MFT was significantly lower for the easiest than for the more difficult items, whereas the two more demanding levels did not differ. Thus, our MFT findings only partially support previous studies showing higher MFT under higher task demands (Maurer et al. 2015). The smaller, non-significant difference between the medium and difficult level may indicate that these levels were less clearly differentiated than the easy and medium level. This interpretation is supported by the less pronounced differences in processing time. Overall, both measures of theta activity change with the mental activity of logical reasoning but are only partially sensitive to the difficulty of the reasoning tasks. Especially, the unexpected results for FPTC need further investigation.

Intelligence as a driving force in taking advantage of cognitively activating STEM curricula: evidence from three controlled intervention studies

Elsbeth Stern

RT

ETH Zürich, Zürich, Switzerland

Intelligence significantly contributes to academic achievement, particularly in STEM subjects requiring abstract conceptual understanding. However, little is known about the conditions that allow intelligence to unfold its potential. Over the past few decades, the learning sciences have developed and evaluated various means of cognitive activation that can be integrated into STEM curricula to promote the acquisition of difficult scientific concepts. Three randomized controlled field trials run in elementary and upper secondary schools investigated how curricula enriched with means of cognitive activation interact with IQ-scores. First, inquiry-based training in experimental skills ($N = 618$) revealed that all students improved their understanding of experimental control. However, only students scoring at the upper end of the intelligence scale understood that a null result of a properly designed experiment can also be informative. Second, an intervention focusing on conceptual understanding in mechanics ($N = 172$)—an area of physics well-known for persistent misconceptions, even among highly intelligent learners — revealed the strongest learning gains among the most intelligent students. Third, a curriculum focusing on a deeper understanding of linear functions in mathematics ($N = 1466$) revealed that the ability to transfer knowledge to new problems increased with intelligence. In all three studies, students across the entire intelligence spectrum benefited from cognitively activating curricula compared to students in the control condition who received regular lessons on the same topics. At the same time, curricula that promote conceptual understanding do not compensate for differences in intelligence, but they support more intelligent learners in constructing meaningful and broadly applicable knowledge.

Panel discussion on future directions in research on intelligence: Early- and mid-career scientists think big

Elsbeth Stern¹, Kirsten Hilger², Kristof Kovacs³, Sandra Oberleiter⁴, and Emily Willoughby⁵

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What should the next generation of intelligence research try to explain, measure, predict, or change? In this panel discussion, early- and mid-career scientists will consider the future of the field from a deliberately ambitious perspective. If constraints on data, funding, methods, and institutional support were relaxed, what questions would become newly answerable? What kinds of studies, collaborations, technologies, and theoretical advances would most improve our understanding of human intelligence? The discussion will invite broad speculation while remaining grounded in current empirical and methodological problems in intelligence research. Topics may include the measurement and structure of intelligence, cognitive and neural mechanisms, developmental and educational implications, genetic and environmental influences, artificial intelligence as a research tool, and the scientific and institutional conditions needed for cumulative progress. Rather than offering a fixed roadmap, the panel aims to open a conversation about what the field could become if researchers were encouraged to think at a larger scale.

Smarter time travel? Intelligence strengthens the well-being benefits of a balanced time perspective

Maciej Stolarski

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University of Warsaw, Warszawa, Poland

Previous research has consistently demonstrated that a balanced time perspective (TP) is strongly associated with various facets of subjective well-being. More recent work has also begun to connect temporal balance with aspects of cognitive functioning, revealing links between TP dimensions and both intelligence and executive processes. Drawing on the theoretical framework of TP theory, we proposed that the advantages of maintaining a balanced temporal profile may be particularly pronounced among individuals with higher cognitive ability. Specifically, greater intellectual capacity may facilitate more flexible shifting between temporal horizons—the past, present, and future—allowing individuals to adjust their focus more effectively to situational demands. Consequently, the well-established relationship between balanced TP and well-being should be amplified at higher levels of intelligence. To examine this hypothesis, we analyzed data from two independent samples: adults ($n = 385$) and adolescents ($n = 251$). In both studies, intelligence moderated the association between temporal balance and well-being, such that the beneficial effects of a balanced TP profile were stronger among individuals with higher IQ. Importantly, in the adolescent sample this moderating effect was also corroborated longitudinally. These findings contribute to a deeper understanding of how cognitive ability interacts with other individual differences in shaping psychological functioning and well-being.

Efficient learning or sustained effort? Replicating and interpreting student profiles in online formative assessments

Stefan J. Troche, Natalie Borter, Ursina E. Raemy

PP

University of Bern, Bern, Switzerland

In a previous study, we identified three groups of students based on their performance and time-on-task data from five continuous online formative assessments (OFAs) completed during a master's-level psychology course: an efficient group (above-average performance and below-average time investment), a high-effort group (average performance and above-average time investment), and a low-effort group (below-average performance and below-average time investment). The aim of the present study was to replicate this three-cluster solution and to examine whether these groups differed in reasoning ability and prior knowledge (both assessed at the beginning of the term), subjective effort (reported after each OFA), and exam grades (assessed at the end of the term). In a sample of 254 students, we successfully replicated the three-cluster solution. Students in the efficient group demonstrated higher prior knowledge and reasoning ability than students in the other groups, who did not differ in reasoning ability and prior knowledge. Students in the high-effort group reported greater subjective effort than those in the low-effort group, supporting the interpretation of time investment as an indicator of effort. Finally, the low-effort group achieved lower exam grades than the other two groups, whereas the efficient and high-effort groups did not differ from one another. These findings suggest two pathways to academic success: one characterized by stronger cognitive prerequisites that enable efficient learning, and another characterized by persistence and sustained effort despite less favorable initial conditions. Identifying these groups based on OFA data collected during the term may help instructors tailor support to students' specific learning needs.

Too smart to be wrong? Narcissism and the illusion of intelligence in children

Marcin Zajenkowski¹, Anna Turek-Wojnarowicz¹, Radosław Rogoza², Gilles Gignac³  RT

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Intelligence is a socially valued attribute that becomes important early in development. Consequently, individual differences in children's self-evaluations of cognitive ability may have meaningful implications, and narcissism may be an important correlate of these perceptions. In adults, narcissism is typically weakly related or unrelated to objectively measured intelligence but is reliably associated with self-assessed intelligence, with effects varying across narcissism facets. Extending this work to childhood, we conducted a two-wave longitudinal study in a sample of Polish children (Wave 1: $N = 243$, ages 7–10; Wave 2: $N = 231$; 6-month interval). At both waves, children completed measures of agentic, antagonistic, and neurotic narcissism, as well as self-perceived intelligence (SPI). Objective intelligence was assessed with Raven's Coloured Progressive Matrices and Cattell's Culture Fair Intelligence Test 20-R. Consistent with our hypothesis, agentic narcissism was positively associated with SPI at both waves, $r_s = .22-.43$. Additionally, agentic and antagonistic narcissism were negatively associated with objective intelligence. Overall, the findings suggest that facet-specific associations between narcissism and perceived intelligence, as well as their dissociation from objective ability, may already emerge in childhood.

Why don't they report that? The lingering effects of early twentieth-century intelligence testing on twenty-first-century educational measurement

Paul Westrick

RT

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After the United States adopted the Army Alpha for personnel screening in World War I, intelligence testing gained widespread acceptance in the United States, including the education system. At the same time, many Americans, including prominent psychologists, used intelligence testing results to advance eugenics. Though the intelligence-education and intelligence-eugenics connections were widely accepted in the early twentieth century, the overwhelming rejection of eugenics after World War II led to an increase in anti-testing sentiments that persists to this day. One area affected by this history is college admission testing. Carl Brigham participated in the development of the Army Alpha, and he used it as a model for the Scholastic Aptitude Test (SAT), which in 1926 replaced the essay exams used by College Entrance Examination Board members. The SAT has gone through numerous revisions over the past century. Based on the language College Board uses, the current SAT could best be described as a test of skills and knowledge, and College Board makes no claim that it is an intelligence test. Regardless, some testing critics will go back a century to Brigham, intelligence testing, and the eugenics movement to attack the SAT today. The ACT, another widely used college admission test, also faces these criticisms. These attacks have consequences. Admission test developers publish reports that often puzzle outsiders because the reports exclude certain descriptive statistics and analyses that readers expect to see in such reports. This presentation provides insights on these issues, including reports to which the presenter contributed.

The first twin decomposition of diffusion-model parameters and intelligence shows genetic overlap concentrated in evidence accumulation

*Emily Willoughby*¹, *Guy Madison*²

RT

¹ University of Minnesota Twin Cities

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The drift-diffusion model decomposes reaction time into cognitively interpretable parameters, of which drift rate (rate of evidence accumulation) is most strongly associated with intelligence. The genetic basis of this association remains untested with classical twin methods, leaving open whether genetic overlap with intelligence is concentrated in drift rate or also involves boundary separation and non-decision time. We addressed this question using choice reaction time and Wiener Matrizen-Test (WMT) IQ data from the Swedish Twin Registry's STAGE cohort (664 MZ and 608 DZ complete pairs; 6,644 individuals under full-information maximum likelihood; ages 27–54). EZ-diffusion parameters were residualized for age, sex, and timing application. AE models were preferred over ACE by AIC. Heritabilities were 0.28 [0.21, 0.34] for drift rate, 0.22 [0.14, 0.28] for boundary separation, 0.17 [0.10, 0.24] for non-decision time, and 0.59 [0.54, 0.63] for WMT IQ. Bivariate Cholesky decompositions revealed that drift rate showed a significant genetic correlation with IQ ($r_g = 0.33$ [0.24, 0.41]), whereas boundary separation (response caution) showed a negative correlation ($r_g = -0.29$ [−0.35, −0.16]) and non-decision time showed weak, non-significant overlap. A joint four-variable Cholesky revealed a substantial negative genetic correlation between drift rate and boundary separation ($r_g = -0.54$ [−0.80, −0.31]) that was largely independent of the IQ overlaps, shrinking only to −0.50 when WMT was partialled out. Genetic overlap between diffusion-model parameters and intelligence thus appears to be concentrated in evidence accumulation, alongside a distinct heritable speed-caution tradeoff that operates independently of general intelligence.

Smart but detectable? Does intelligence moderate neural efficiency in the P300-based Concealed Information Test?

Jerzy Wojciechowski, Natalia Jaśkiewicz, Piotr Budzianowski

PP

University of Warsaw, Faculty of Psychology, Warsaw, Poland

The Neural Efficiency Hypothesis (NEH) posits that higher intelligence (g) is associated with more efficient (reduced) cortical activation during cognitive tasks. While the P300-based Concealed Information Test (P300-CIT) is a robust tool for detecting hidden knowledge, it remains unclear whether high-IQ individuals can utilize their superior cognitive resources to "mask" neural recognition signals. This study investigates whether fluid intelligence and task-switching ability moderate the P300 response in a Complex Trial Protocol version of the P300-CIT.

A sample of 61 participants was assigned to one of three conditions: Guilty (knowledgeable participants who committed a mock-crime), Innocent Informed (possessing knowledge but not having performed the mock-crime), and Innocent (naïve). Intelligence was assessed using the International Cognitive Ability Resource (ICAR), and executive control was measured via a Task-Switching task. Brain activity was recorded using EEG, focusing on P300 amplitude and latency for probe (crime relevant detail) and irrelevant (detail from the same category but not connected to the mock-crime) stimuli.

Analyses revealed a classic P300-CIT effect (amplitude for Probe > Irrelevant), however intelligence did not moderate the magnitude of the CIT effect, indicating that high-IQ individuals cannot successfully hide their knowledge (neural recognition response) during the CIT. Nonetheless, some evidence for the NEH was found: higher ICAR scores correlated with lower absolute P300 amplitudes in both knowledgeable groups.

Intelligence may be associated with neural efficacy, but it does not attenuate the diagnostic signal of the P300-CIT. These findings suggest that the P300-based detection of concealed information remains robust across individual differences in general intelligence.

Intelligence as a target for preimplantation genetic testing

Tobias Wolfram, *Ivan Davidson, Jonathan Anomaly*

RT

Herasight Research, Wilmington, USA

Polygenic embryo screening for cognitive ability is no longer a purely hypothetical possibility, yet debate has moved faster than careful evaluation of whether intelligence satisfies the criteria that would justify its inclusion in preimplantation genetic testing. This talk argues that it does. First, embryo screening for cognitive ability presupposes a phenotype that can be measured reliably, predicted meaningfully, and linked to outcomes that matter for human welfare. General intelligence meets this standard better than most behavioral traits: it is psychometrically robust, developmentally stable, biologically grounded, and strongly associated with educational, occupational, health, and social outcomes. Second, the genetic evidence is now sufficient to make embryo ranking informative. Intelligence is substantially heritable, exhibits within-family additive genetic variance, and recent polygenic scores explain sufficient within-family variance to support meaningful embryo differentiation. Third, the principal ethical objections do not show that intelligence should be excluded from PGT-P. The disease/enhancement boundary is morally unstable, non-identity arguments do not establish wrongdoing, and egalitarian concerns are better addressed through institutions that increase access than through prohibition. The conclusion is not that every commercial implementation of embryo selection for intelligence is scientifically adequate or ethically justified. Rather, the common claim that intelligence is uniquely unfit for embryo screening fails on both empirical and ethical grounds. The relevant question is no longer whether intelligence may be included in preimplantation genetic testing, but under what conditions it should be offered.

Beyond g: “Either this is madness or it is Hell.” “It is neither,” calmly replied the voice..., “it is knowledge; it is two gs.”

*Michael Woodley of Menie*¹, *Matthew Sarraf*², *Mateo Peñaherrera-Aguirre*³, *Thomas Coyle*⁴,
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Cattell–Horn–Carroll models of intelligence often reveal a striking “g paradox”: at the group-factor level, Gf is most strongly associated with g, yet at the subtest level, Gc measures often show the highest g loadings. A common resolution identifies Stratum-III g with Stratum-II Gf and treats the substantial g loadings of crystallized subtests as downstream products of Gf investment in learning. But the evidence for investment theory is limited. We argue that this paradox reflects a measurement problem. Gf corresponds to specific cognitive entities, the proper testing of any one of which is mentally taxing, making it difficult for any single indicator to represent the full breadth of Gf and thus reducing Stratum-I g loadings. The Gf group factor reflects the composite of these entities and is therefore uniquely associated with g at Stratum II. Gc subtests, in turn, broadly index the quality of many cognitive processes and thus relate to factors that exert formative effects on g at Stratum I. Traditional models are trapped in Spearman’s “flatland”: a two-dimensional psychometric space forcing two solutions to the results of factor analysis: either only one reflective general factor occupies the apex of a psychometric hierarchy, or g emerges instead from a heterarchical psychometric mélange of formative influences. Adding a third dimension allows two broadly general factors to be integrated: a bottom-up, formative “proto g” (gp), associated primarily with Gc, and a top-down, reflective “neo g” (gn), associated primarily with Gf. Network and meta-analytic genetic evidence is consistent with this model.

Symposium: Well beyond g: travelling outside of Spearman's Flatland

Michael Woodley of Menie¹, Thomas Coyle², Matthew Sarraf³, Mateo Peñaherrera-Aguirre⁴,
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Progression beyond the confines of highly empirically robust, but increasingly theoretically sterile scientific frameworks, is a critical point in Kuhn's model of the paradigm shift. We argue that the current g paradigm in intelligence research is, despite its significant empirical merits, increasingly becoming an impediment to further scientific progress in this field. In this symposium, we explore three complementary research trajectories that will allow for the development of *new psychometrics*.

In the *first presentation*, the concept of hierarchically nested formative and reflective two gs is presented, along with supporting data. Here, the concept of Spearman's flatland is introduced by way of an analogical structure illustrating how approximately coextensive general factors can co-exist as discrete entities. In the *second presentation* limitations on the generalizability of Spearman's Hypothesis (SH; the role of g saturation as a positive moderator of Black-White performance differences) will be explored with data on incarcerated populations among whom SH reverses due to the action of unshared environmental harshness. In the *third presentation*, novel extensions of the tilt program with respect to age, sex, and, critically, effect non-linearity will be introduced, culminating with the presentation of new data on ability tilt projection traces (super-residuals), yielding novel insights into the behaviour-genetic architecture and fundamental structure of cognitive tradeoffs.

When Spearman's hypothesis reverses: incarceration, non-shared environmentality, and between-group variance partitioning

Michael A. Woodley of Menie, Matthew A. Sarraf, Mateo Peñaherrera-Aguirre, Tom Coyle, and Guy Madison

SY

Spearman's hypothesis predicts that Black-White cognitive performance differences should be larger on more *g*-loaded subtests. Recent evidence from incarcerated populations indicates a striking reversal of this pattern: in Wechsler-series data, Black-White differences in prison and institutionalized samples cluster positively with subtest non-shared environmentality, while loading negatively with *g* and culture-loadedness. By contrast, normative Black-White difference vectors form a distinct pattern more consistent with conventional Spearman effects. This suggests that, under conditions of racialized environmental harshness, group differences may be generated less by variation in general ability than by non-*g*, environmentally contingent variance. We embed this empirical reversal within a broader variance-partitioning framework for between-group differences. Extending DeFries' model, between-group environmentality can be decomposed into structured, ancestry-aligned environmental variance and unstructured, stochastic environmental variance, analogous to shared and non-shared environmental effects in classical biometric models. The latter may operate as a Factor X: producing socially patterned group differences while contributing little or no systematic within-group ancestry-phenotype association. Incarceration provides a plausible empirical case of this process, because racialized exposure to violence, unpredictability, and institutional harshness may amplify unstructured environmental variance and suppress the expected *g*-moderated pattern. The reversal of Spearman's hypothesis therefore illustrates how between-group non-shared environmentality can distort, attenuate, or invert conventional psychometric signals, with implications for interpreting admixture-based estimates of between-group heritability.

From cognitive bias to intellectual grandiosity: how narcissism fuels the overvaluation of intelligence

Marcin Zajenkowski

SY

University of Warsaw, Warsaw, Poland

Narcissism is characterized by an inflated self-image and a strong motivation to maintain beliefs about one's exceptional abilities. The present paper proposes that cognitive biases play a central role in supporting this grandiose self-view, particularly in the domain of intelligence. We integrate evidence from research on narcissism, selective attention, memory biases, and self-enhancement to outline a pathway from biased cognitive processing to the overvaluation of one's intellectual abilities. First, narcissistic individuals tend to display selective attentional and memory processes that favor self-enhancing information, including better recall of successes and diminished recall of failures. Such attentional and memory biases reinforce positive self-beliefs over time. Second, narcissistic individuals often show an inflated perception of their own intelligence, manifested in exaggerated self-assessments and the overinterpretation of ambiguous cues as evidence of intellectual superiority. Finally, the overvaluation of intelligence may serve an important self-regulatory function by sustaining the grandiose self-image and protecting it from threatening feedback. We argue that these biases are not merely by-products of narcissistic personality traits but represent mechanisms that actively maintain narcissistic self-views. By linking attentional and memory processes with biased self-evaluations of intelligence, the present framework provides a cognitive perspective on how narcissistic individuals construct and preserve beliefs about their exceptional abilities.

Intelligence and the self: cognitive biases, decision-making, and well-being

Marcin Zajenkowski¹, Maciej Stolarki¹, Gilles Gignac², Radosław Rogoza³

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¹ University of Warsaw, Warsaw, Poland

² University of Western Australia, Perth, Australia

³ Vizja University, Warsaw, Poland

This symposium explores how intelligence relates not only to cognitive performance but also to how individuals make decisions, navigate time perspectives, and evaluate their own abilities. Together, the presentations reveal that cognitive ability interacts with biases, motivational tendencies, and personality traits to influence real-world outcomes and intellectual self-views.

The first presentation of Maciej Stolarki demonstrates that intelligence strengthens the psychological benefits of maintaining a balanced time perspective. Using data from both adults and adolescents, it shows that individuals with higher cognitive ability may be better able to flexibly shift between temporal horizons, amplifying the positive relationship between temporal balance and well-being.

The second presentation of Gilles Gignac examines how intelligence relates to several cognitive-motivational tendencies relevant to economic decision-making. Findings indicate that higher intelligence is associated with lower susceptibility to biases such as the sunk cost effect, reduced endorsement of extrinsic money values, greater strategic flexibility, and lower apophenic thinking.

The third presentation of Radosław Rogoza investigates the dynamic relationship between narcissism and self-assessed intelligence using a 30-day daily diary design. Results reveal that agentic narcissism is positively associated with subjective intelligence and that fluctuations in narcissistic states predict subsequent changes in self-perceived intellectual ability.

Finally, the fourth presentation of Marcin Zajenkowski proposes a cognitive framework linking narcissism with the overvaluation of intelligence, suggesting that attentional and memory biases help maintain grandiose intellectual self-views. Collectively, these contributions highlight how intelligence operates within a broader psychological system involving cognition, personality, and self-evaluation.

List of Participants

Afen, Innocent	The Catholic University of Eastern Africa
Arakelyan, Madlena	Yerevan State Medical University
Ayan, Steve	Writer & Journalist
Balducci, Marco	University of Turku
Becker, Christian	Military Psychological Service, Austrian Military Health Services
Biesok, Andra	Humboldt-Universität zu Berlin
Bleske-Rechek, April	University of Wisconsin-Eau Claire
Caspi, Avshalom	Duke University
Cheng, Shi	Jiangsu Provincial Academy of Social Sciences
Bruton, Oliver	Carl von Ossietzky Universität
Büchli, Adrian	Universität Bern
Buettner, Nico	University of Minnesota
Buonaccorsi, Andrew	University of Minnesota
Busse, Friederike	Ulm University
Ceci, Stephen J.	Cornell University
Ceraudo, Leognano	University "Magna Graecia"
Chuderski, Adam	Jagiellonian University
Demetriou, Andreas	Cyprus Academy of Sciences, Letters, and Arts
Esposito, Lorenzo	Disfor, University of Genoa
Frey, Meredith	Otterbein University
Gantscheva, Lily	University of Basel
Ganzach, Yoav	Tel Aviv
Garner, Kayla	Northwestern University
Gentzis, Ersie	New Mexico State University
Giannelis, Alexandros	Erasmus University Rotterdam
Gignac, Gilles	University of Western Australia
Górniak, Jeremiasz	University of Warsaw
Greenwood, Emma	University of East Anglia
Heller, Johanna	University of Vienna
Hesting, Leo	Association for Smarter Youth
Hilger, Kirsten	Würzburg University
Hovinga, Femke	SCALIQ
Johnson, Knute	University of Minnesota-Twin Cities
Jungeblut, Henrike	Johannes Gutenberg University
Karwowski, Maciej	University of Wrocław
Kazali, Elena	University of Ioannina

Kovacs, Kristof	ELTE Eotvos Lorand University
Krolo, Maximilian	Saarland University
Kuncel, Nathan	University of Minnesota
Lee, James	University of Minnesota
Leniarska, Maria	Vizja University
Lesche, Sven	Institute of Psychology
Lesigang, Jonas	University of Vienna
Liuzza, Marco Tullio	University of Padova
Moffitt, Terrie	Duke University & King's College London
Morris, Damien	King's College London
Nöth, Tobias	Vinzenz Pallotti University
Oberleiter, Sandra	University of Vienna
Peñaherrera-Aguirre, Mateo	University of Arizona
Pietschnig, Jakob	University of Vienna
Rogoza, Radosław	Vizja University
Ross, Delaney	University of Minnesota
Rüegg, Eileen	University of Zurich
Schubert, Anna-Lena	Johannes Gutenberg University Mainz
Spanoudis, George	University of Cyprus
Sparfeldt, Jörn	Saarland University
Stabile, Vincent	Oakland University
Staufer, Nicolas	University of Bern
Stern, Elsbeth	ETH Zürich
Stolarski, Maciej	University of Warsaw
Troche, Stefan	University of Bern
Turek, Anna	University of Warsaw
Westrick, Paul	Independent Researcher
Willoughby, Emily	University of Minnesota
Wojciechowski, Jerzy	University of Warsaw,
Wolfram, Tobias	Herasight Research
Woodley of Menie, Michael	Independent researcher
Zajenkowski, Marcin	University of Warsaw

Award-Winner Spotlight

Distinguished Contributor Interviewee

Terrie E. Moffitt is the Nannerl O. Keohane University Professor at Duke University and Professor of Social Development at King's College London. Her research has transformed developmental psychopathology through longitudinal studies of antisocial behavior, mental health, aging, and genetic and environmental risk. She is closely associated with the Dunedin Multidisciplinary Health and Development Study and the Environmental-Risk Longitudinal Twin Study, landmark projects linking early-life risks to later psychological, cognitive, and health outcomes.



Constance Holden Awardee

Steve Ayan is a psychologist, science journalist, and author based in Heidelberg, Germany. He has written widely on psychology, neuroscience, consciousness, moral psychology, psychotherapy, and cognitive science, and is associated with *Gehirn & Geist*, the German-language magazine devoted to mind and brain research. His work has contributed to the public understanding of psychological science by bringing research on cognition, behavior, and mental life to broad audiences in a clear and thoughtful form.



Useful Information

Getting around the University of Warsaw

The conference venue is the **Old Library** (number 9 on the map) on the **University of Warsaw Main Campus**, at **Krakowskie Przedmieście 26/28**, near the Royal Route and within walking distance of Warsaw Old Town. The closest metro station is **Nowy Świat-Uniwersytet** on line **M2**; the **Uniwersytet** bus stop is served by several routes, including 106, 111, 116, 128, **175**, 178, 180, 503, and E-2. From **Warsaw Chopin Airport**, **bus 175** provides a direct connection to Uniwersytet; from **Warszawa Centralna**, buses 128 and 175 are direct options. Public transport tickets are valid across buses, trams, metro, and urban rail services and can be bought from machines, kiosks, and mobile apps.

The conference banquet will begin at 7:30 PM on Wednesday, July 15 and will be held at **Restauracja BursztyNova** (<https://bursztynovarestauracja.pl/>). It is about 1.1 km (a 15-minute walk) from the University of Warsaw Old Library, and 1 km from the Hotel Bristol.

For public transport routing, the local host recommends **Jakdojade** (<https://jakdojade.pl>), the most widely used public transport app in Warsaw; it supports English and is useful for checking routes, times, and connections. Taxi and ride-hailing services such as **Uber** and **Bolt** are also widely available. The Polish currency is the **Polish złoty (PLN)**, but **cashless payments are accepted almost everywhere**.

Exploring Warsaw

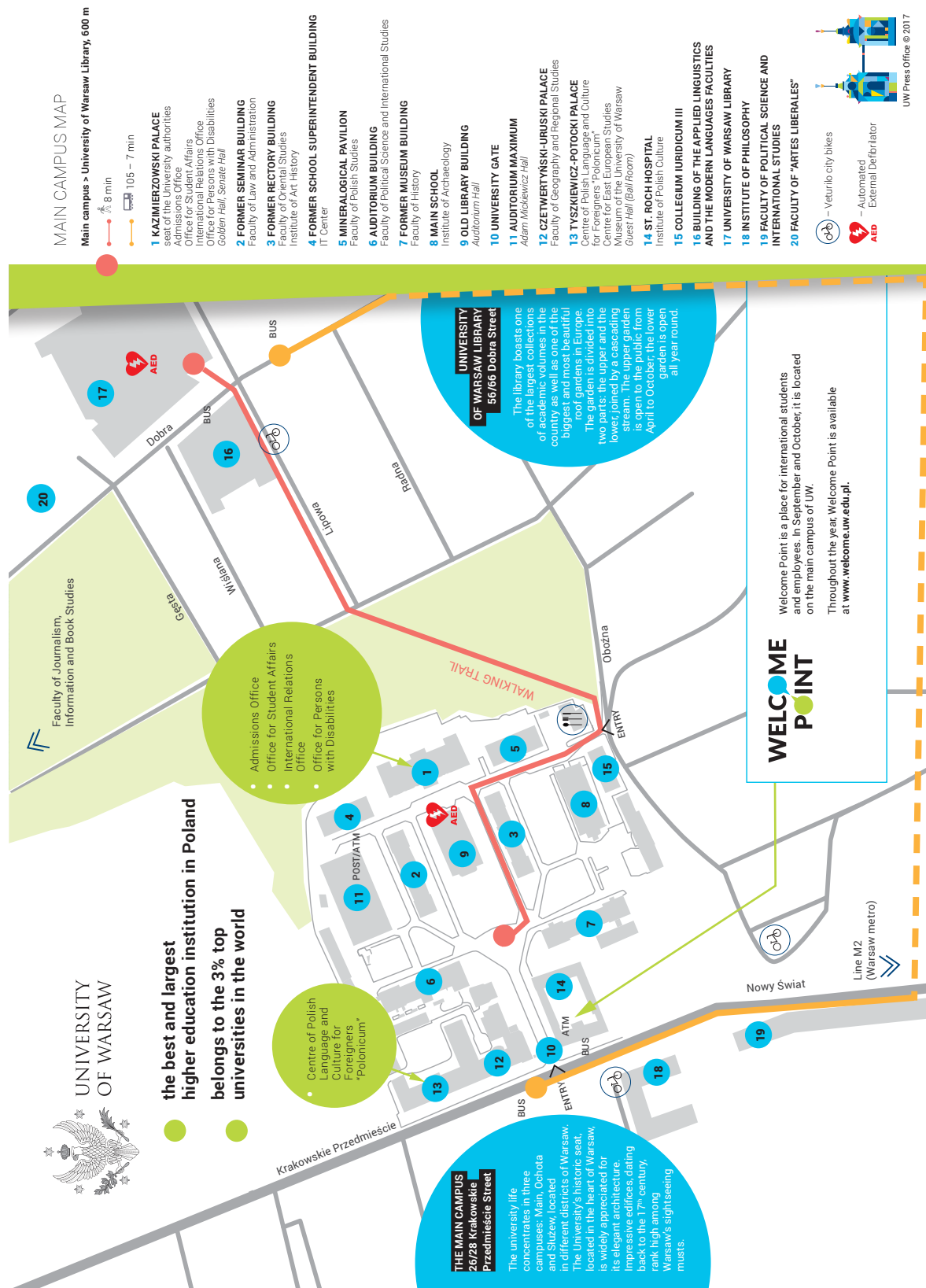
Warsaw is not an untouched old capital, but a city rebuilt and layered back into existence. Its **Historic Centre** is a **UNESCO World Heritage Site** because the Old Town was reconstructed after World War II using surviving fragments, historical records, paintings, drawings, and the prewar street plan. The University sits directly on the **Royal Route**, the ceremonial axis linking the Royal Castle, churches, palaces, parks, and former royal residences. A good first walk is simple: start at the campus gate, continue to **Castle Square** and the **Old Town**, then return by way of the **Vistula** or **Nowy Świat**.

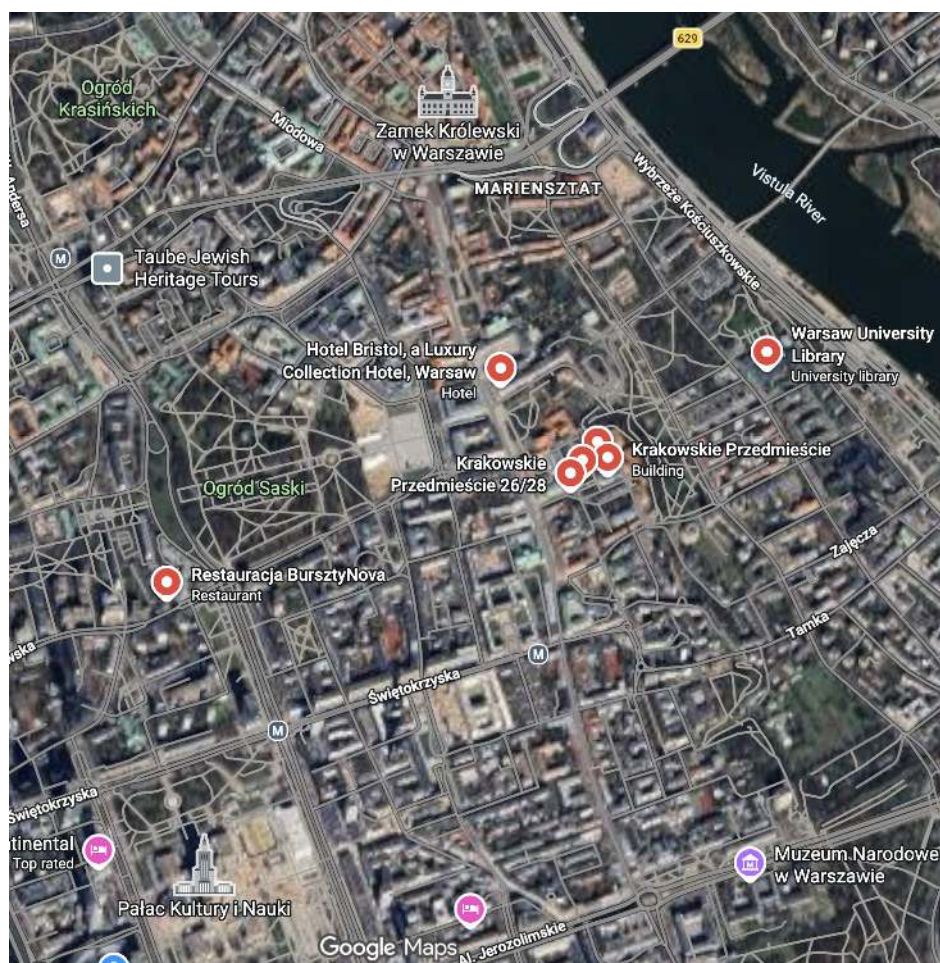
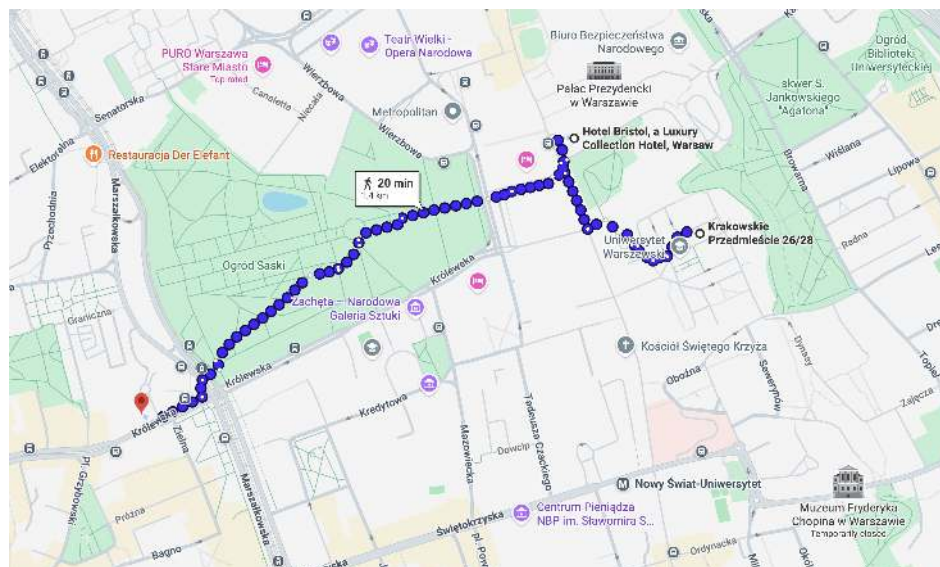
Things to do in Warsaw

Many of Warsaw's major sites are close to the University or along the **Royal Route**. From the campus gates, Krakowskie Przedmieście leads toward **Castle Square**, the **Royal Castle**, and the reconstructed **Old Town**; in the other direction, Nowy Świat and Aleje Ujazdowskie lead toward **Łazienki Park** and **Wilanów Palace**. Nearby options include the **Old Town Market Square**, the **Vistula boulevards**, the **University of Warsaw Library rooftop gardens**, the **Chopin Museum**, the **Copernicus Science Centre**, and the **National Museum**. For deeper historical context, consider the **POLIN Museum of the History of Polish Jews** or the **Warsaw Rising Museum**.

Ten things to see in Warsaw

1. **Old Town Market Place.** The historic heart of Warsaw, rebuilt after World War II and now part of the city's UNESCO-listed Historic Centre. Colorful townhouses, cafés, and cobblestone streets make it one of the city's most atmospheric places.
2. **Royal Castle.** Former residence of Polish kings, reconstructed after wartime destruction. Visitors can see royal apartments, paintings, and ceremonial halls.
3. **Łazienki Park.** Warsaw's most elegant park, famous for the Palace on the Isle, peacocks, and the Chopin Monument. In summer, free Chopin concerts are held there on Sundays.
4. **Palace of Culture and Science.** The city's most recognizable building. Its observation terrace offers one of the best panoramic views of Warsaw.
5. **POLIN Museum of the History of Polish Jews.** A major modern museum presenting 1,000 years of Jewish history in Poland through immersive exhibitions.
6. **Warsaw Uprising Museum.** A powerful multimedia museum dedicated to the 1944 Warsaw Uprising and the destruction of the city during World War II.
7. **University of Warsaw Main Campus.** A beautiful historic campus on Krakowskie Przedmieście, with gardens, classical architecture, and a lively academic atmosphere.
8. **Vistula Boulevards.** Modern riverside promenades with cafés, bars, beaches, and outdoor events, especially lively on summer evenings.
9. **Wilanów Palace.** Often called the "Polish Versailles," this baroque palace survived the partitions and wars and is surrounded by formal gardens.
10. **Copernicus Science Centre.** An interactive science museum with hands-on exhibits about physics, technology, and the human mind.





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Instytut Studiów Społecznych im. Profesora Roberta Zajonc
The Robert Zajonc Institute for Social Studies



Robert Zajonc Institute for Social Studies



Polish Psychological Association



PRACOWNIA TESTÓW
PSYCHOLOGICZNYCH
POLSKIEGO TOWARZYSTWA
PSYCHOLOGICZNEGO

Pracownia Testów Psychologicznych
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Local organizing committee

The ISIR 2026 local organizing committee is chaired by **Marcin Zajenkowski** and includes **Maciej Stolarski**, **Jerzy Wojciechowski**, **Jeremiasz Górniak**, **Anna Turek**, and **Maria Leniarska**.

Robert Zajonc Institute for Social Studies

The local organizing unit for ISIR 2026 is the **Robert Zajonc Institute for Social Studies** at the University of Warsaw. Robert B. Zajonc was a Polish-born American psychologist whose work helped shape modern social psychology, especially through his research on social facilitation, affect, and the mere-exposure effect. Born in Łódź, Poland, he later built much of his career at the University of Michigan and became one of the most influential psychologists of the twentieth century. His famous claim that “preferences need no inferences” helped renew interest in affective processes and the relationship between emotion and cognition. He also contributed to intelligence research through the confluence model of birth order, family size, and intellectual development.



Future meetings

ISIR's **2027** meeting will take place in July in **San Antonio, Texas**, with local host **Thomas Coyle**. San Antonio is one of the most distinctive conference cities in the United States, with its historic downtown organized around the **River Walk**, a network of pedestrian paths, bridges, restaurants, and shaded walkways set below street level along the San Antonio River. The city also offers unusually deep historical texture: the San Antonio Missions, including the Alamo, form the only **UNESCO World Heritage Site in Texas**. Our 2028 meeting will be held in **Copenhagen, Denmark** with local host Gunhild Okholm. Please email admin@isironline.org if you would like to discuss hosting a future meeting.



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