London Conference on Intelligence 2016

Prof E.L.Thorndike

1874 – 1949

Selective breeding can alter man's capacity to learn, to keep sane, to cherish justice or to be happy. There is no more certain and economical a way to improve man's environment as to improve his nature.

London Conference on Intelligence 2016
G22 Lecture Theatre, Pearson Building, UCL

Friday 13 May

2 pm   *Meeting speakers and guests*
3.20   Welcome and Introduction. J Thompson
3.30   Sex differences in PISA: Some counterintuitive results G Meisenberg,MA Woodley of Menie.
4:00   Total fertility rates, *Big G* and the cognitive metagene: A cross-country moderation analysis. MA Woodley of Menie, Davide Piffer & Mateo A. Peñaherrera
4.30   *Tea*
5:00   Differential Demographic analysis of the destabilisation of Europe. Helmuth Nyborg
5:30   Evidence of dysgenic fertility in China Mingrui Wang, John Fuerst
6:15   Guided London walk (5 minutes) to The Grafton Arms, 72 Grafton Way London W1T 5DU for your choice of pub drinks and food.

Saturday 14 May

9:30   Evolutionary indicators for explaining cross-country differences in cognitive ability. Heiner Rindermann
10:00 Positive effects of intergroup competition upon in-group collectivism, slow life history, human capital, and intelligence: The case of historical Japan. Heitor B. F. Fernandes, Kenya Kura, A.J. Figueredo
10:30 Sex differences in intelligence. R Lynn

11:00 *Coffee*
11:30 The Swedish Scholastic Assessment Test. Guy Madison
12:00 Demographic, economic, and genetic factors related to national differences in ethnocentric attitudes. Ed Dutton, Guy Madison & Richard Lynn
12:30 ICAR5: a 5-item public domain cognitive test. Julius Daugbjerg Bjerrekær
1:00   Plenary discussion with previous speakers
1:30   *Lunch break*
2:30   Biogeographic Ancestry and Socioeconomic Outcomes in the Americas: a Meta-analysis. Emil O. W. Kirkegaard, John Fuerst
3:00   Publication bias: An exploratory meta-analysis. Jan te Nijenhuis, Xavier Macdaniel
3:30   Functional architecture of visual emotion recognition ability: A latent variable approach. Gary Lewis
4:00   *Tea*
4:30   The Welfare Trait: how state benefits affect personality. Adam Perkins
5:00   Population genetics in intelligence research: How much can it help to retrace the evolution of intelligence? David Becker, Heiner Rindermann
5:30   Plenary session with previous speakers
6:00   Pre-dinner pub drinks: The Prince of Wales Feathers, 8 Warren Street, London, Greater London, W1T 5LD 5 mins away, and very close to the dinner location.
7:30   Speaker's Dinner: Ask Italian, 48 Grafton Way, LondonW1T 5DZ. 4 minutes away. Non-speakers welcome at their own cost.

Sunday 15 May

9:00   Structural Equation Modeling with Neuropsychological Data from an Epidemiological Field Study in the Faroe Islands. Fróði Debes, Arne Ludvig, Mariann Ellendersen, Katrin Reinert, Anna Sofía Veyhe, Pál Weihe, and Philippe Granjean

9:30   Openness to Experience Predicts Leftism in the Right Tail of Intelligence. N Carl

10:0   Sex differences in brain size do translate into difference in general intelligence: Findings from the Human Connectome Study. Dimitri van der Linden, Curtis S. Dunkel

10:30 *Coffee*

11:00 The Co-Occurrence Nexus Hypothesis. A.J. Figueredo, MA Woodley of Menie, Heitor B. F Fernandes, Mateo Peñaherrera Aguirre, Candace Jasmine Black.

11:30 Communicating our work to the public. J Thompson

11:45 Planning for next year: inviting the public; date, day of week, conference content, location.

12:30 Close of conference
Farewell Lunch and drinks in nearby pubs and restaurants.

Abstracts

Sex differences in PISA: Some counterintuitive results

Speaker: Gerhard Meisenberg
Co-author: Michael A. Woodley of Menie

Sex differences in school achievement and intelligence are often believed to depend on socioeconomic and cultural factors. Specifically, the expectation is that the extent to which female emancipation has been achieved in countries is reflected either in rising female relative to male achievement, or that the ability profile of females becomes more similar to that of males as females penetrate into previously male-dominated social and economic niches. The present study examines these predictions by analyzing the results of the PISA (Program of International Student Assessment) tests of mathematics, science and reading, administered to 15-year-olds in a three-year cycle from 2000 to 2012. The study looked at three outcome measures:

1. Overall performance (math, science and reading averaged) of females relative to males. In the large majority of countries, females outperform males.
2. Gender-typicality of achievement profiles. Typically, males are somewhat better at math (1.5 points on the IQ scale), females are far better at reading (5 points on the IQ scale), and sex differences in science are minimal.
3. Score variability assessed as the ♂/♀ variance ratio. Males are more variable than females in the large majority of countries.

Of the three outcomes, the female advantage in overall achievement is greatest in the Muslim countries of North Africa and the Middle East as well as the ex-Communist countries of Eastern Europe and the former Soviet Union, and virtually non-existent in Latin America. Other world regions fall in between. Its relationship to measures of social and economic development is near-zero. Although unrelated to composite measures of female empowerment, the female overperformance tends to be *positively* related to the endorsement of male dominance, according to the World Values Survey. The gender-typicality of achievement profiles varies little among world regions and is virtually unrelated to development indicators and measures of female empowerment or emancipation. It tends to be slightly lower in countries with pro-family attitudes, and slightly greater in countries where people believe that both husband and wife should contribute to family income. The variance ratio is higher (more gender-dimorphic) in economically and socially more "advanced" countries, but does not vary systematically with measures of gender roles and gender-related attitudes. The results show that sex differences in school achievement are quite stable across countries. Neither economic development nor the progress of female emancipation or empowerment have been successful at virilizing female achievement levels or achievement profiles.

Speaker: Michael A. Woodley of Menie

Total fertility rates, *Big G* and the cognitive metagene: A cross-country moderation analysis.

Co-authors: Davide Piffer & Mateo A. Peñaherrera

Between countries, total fertility rate (TFR) and cognitive ability are negatively correlated, which suggests that the world's IQ should be declining. Also, the population-level frequencies of several SNPs have been found to predict IQ between countries. Could latent variables among measures of ability and the SNPs moderate the association of these with TFR? Using a *Big G* factor constructed from five measures of cognitive ability, a large-magnitude Jensen effect is found on the TFR-cognitive ability relationship ($\rho=.56$, $N=60.6$ countries). Using frequency data on seven SNPs, it is found that the strength of the loading of the common factor among the SNPs (termed a metagene) is a positive and large magnitude predictor of the magnitude of the TFR-SNP frequency relationship ($\rho=.867$, $N=18$ countries). These findings indicate *polygenic selection* against *G*. Finally, when controlled for both Human Development Index and national IQ, metagene frequency remained a modest magnitude and significant predictor of TFR in multiple-regression ($\beta=-.371$, $N=18$ countries). This indicates that polygenic selection operates directly on the genetic variance associated with cognitive ability. Based on these results, it is estimated that differential fertility between countries should be reducing heritable *G* globally by -.253 points per decade.

Differential Demographic analysis of the destabilisation of Europe

Speaker: Helmuth Nyborg

European countries have recently received historically large numbers of immigrants from various countries. Those coming from North East Asian countries generally fare well, whereas many immigrants from Southern non-Western countries find it difficult to assimilate. The biological nature of these ethnic differences, and their consequences for receiving countries, are analysed in terms of *Differential Demographic* and *Cold Winter* theory. The analysis suggests that Europe is in the midst of a critical demographic transition, due partly to long-term internal genotypic decay and sub-replacement fertility, partly to significant low IQ, high fertility Southern non-Western immigration. It is concluded that this internal and external double reversal of Darwinian selection threatens the sustainability of European democracy, welfare, and civilisation.

Evidence of dysgenic fertility in China

Speaker: Mingrui Wang

Co-author: John Fuerst

The relationship between fertility, intelligence, and education was examined in China using a large sample sourced from the population-representative China Family Panel Studies (CFPS) dataset. For the 1951-1970 birth cohort, the correlation between fertility and gf was -.10. The strength of recent selection against gf in China substantially increased between the 1960s and the mid-1980s. Later (between 1986 and 2000), the speed of decline in gf due to selection stabilized at about .31 points per decade with a slightly downward trend. The total loss from 1971 to 2000 due to dysgenic fertility is estimated to be .75 points. A negative relationship between educational attainment and fertility was additionally found. Both negative relations were stronger for women.

Evolutionary indicators for explaining cross-country differences in cognitive ability

Speaker: Heiner Rindermann

Until now all genetic explanations of international intelligence differences suffer from hard and replicated evidence on cognitive ability coding genes and their biological mechanism. However, there is first direct (based on coding genes) and broad indirect evidence. The paper will summarise the findings: Genomewide association studies have detected first candidate genes coding intelligence and differences in intelligence at the individual as well as at the cross-country level. Differences in cognitive ability vary with genetic markers standing for a different evolutionary history. Genetically more similar nations are also more similar in intelligence also if further factors are controlled. Morphological features and indicators of evolution (cranial capacity, skin brightness) highly correlate with results in international intelligence and student assessment studies. Bigger brains lead to higher intelligence. Evolutionary theories explain the development of differences between peoples in psychological traits. There is evidence for recently accelerated evolution among humans. Deleterious effects of consanguineous marriages underscore the effect of genes on cognitive ability at the level of individuals and nations and also show that genetic effects depend on culture. Current humans can be distinguished in different evolutionary branches usually named for living beings subspecies. The total evidence indicates that recent evolution, in the last 20,000 to 100 years, is more important for current human macrosocial differences than former evolution.

Positive effects of intergroup competition upon ingroup collectivism, slow life history, human capital, and intelligence: The case of historical Japan

Speaker: Heitor B. F. Fernandes

Co-authors: Kenya Kura, A.J. Figueredo

Competition between groups has been argued to select for ingroup altruism, slow life history, intelligence, and related psychosocial traits evolutionarily. To test if such effects can be observed over historical time in human populations, we used prefecture-level data on the major military events that occurred since AD 1000 in Japan ($n=523$). Positive effects of per-capita frequency of battles (PCFB) during the highly competitive Warring States period were observed to positively predict prefecture-level collectivism (cohesion and self-sacrifice within extended families), slow life history (an aggregate of longevity, reversed fertility rate, reversed infant mortality, height), intelligence (national achievement tests with adolescent students), and human capital (an aggregate of percentage of high-school graduates pursuing further education, employment rate, socioeconomic position, income, savings), but not social capital (an aggregate of trust in and frequency of socializing with others, and volunteer activity in the community). PCFB in previous and subsequent more peaceful periods, during which conflict was not consistent, showed weaker and less interpretable effects. Prefectures which were more victimized by WW-II bombings present faster life history, lower intelligence and human capital, and more social capital, as targeted prefectures were not necessarily those that were more socially organized for and engaged in competition against enemies. No period predicted psychological health (an aggregate of life satisfaction, happiness, peace of mind, energy, reversed hopelessness, reversed depression, reversed loneliness, reversed impacts of mental-health problems). We discuss the usefulness of theories of group selection, individual selection, and proximate effects for understanding the results.

Sex differences in intelligence

Speaker: Richard Lynn

For approximately a century it has been consistently asserted that there is no sex difference in general intelligence defined as the IQ obtained from tests of a number cognitive abilities like the Wechslers and Stanford-Binets Burt and Moore (1912), Terman (1916), Cattell (1971, p.131): "it is now demonstrated by countless and large samples that on the two main general cognitive abilities – fluid and crystallized intelligence – men and women, boys and girls, show no significant differences"; I have disputed this consensus Lynn (1994, 1999) and argued that while there is virtually no sex difference in general intelligence among children up to the age of 15 years, from this age onwards males develop a small average advantage that increases with age reaching approximately 4 IQ points among adults. My thesis and data have been generally ignored by students of this question who have continued to assert that there is no sex difference in general intelligence. Thus, Halpern (2000, p.218): sex differences have not been found in general intelligence"; Bartholomew (2004, p.91) "men have larger brains than women but display no significant advantage in cognitive performance"; Anderson (2004, p. 829): "it is an important finding of intelligence testing that there is no difference between the sexes in average intellectual ability"; Halpern (2012, p. 233) "females and males score identically on IQ tests"; and Ritchie (2015, p. 105): "women tend to do better than men on verbal measures, and men tend to outperform women on tests of spatial ability; these small differences balance out so that the average general score is the same". My contribution will present new evidence that my thesis is correct.

Speaker: Guy Madison

The Swedish Scholastic Assessment Test

Introduced in 1977, the Swedish Scholastic Aptitude Test (SweSAT) was initially open only for those who had not attended or had failed upper-secondary school, as a way to qualify for tertiary education. It became open to anyone in 1991, and has gradually become a tool for accessing attractive courses, resulting in 100-150 thousand tests taken annually. The purposes of this presentation are to inform about the SweSAT as a potential resource for future research and to present some analyses of sex differences for various subtests from 2005 and 2015. I will briefly describe the structure, types of items, reliability, and validity of the SweSAT. Available standard covariates are age (birth year), sex, secondary and tertiary education, and place of testing. A controversial aspect of the SweSAT is that males tend to perform 0.3-0.5 SD better than females overall, consistent with the typical pattern in school settings that males have poorer grades, better test results, and about the same level of knowledge. I argue that that the SweSAT is effectively an intelligence test, as it was designed to measure learning ability and knowledge, which is also - within a certain cultural context – mainly a product of intelligence. It constitutes a huge and underused data source that has hitherto mostly been studied by the researchers who develop it.

Demographic, economic, and genetic factors related to national differences in ethnocentric attitudes

Speaker: Ed Dutton

Co-authors: Guy Madison & Richard Lynn

We conducted a review of factors associated with individual and group level differences in positive ethnocentrism and negative ethnocentrism. We inter-correlated data sets on national differences on these factors (such as atheism) or implicitly related factors (such as per capita income) with data from the World Values Survey with regard to national differences in measures of Positive Ethnocentrism and Negative Ethnocentrism. The two different survey items for each construct were strongly correlated, but the constructs themselves were not significantly associated. A series of multiple regression analyses indicated that Negative Ethnocentrism was mainly related to high levels of cousin marriage and the frequency of the DRD4 repeat gene, and that Positive Ethnocentrism was mainly related to a young median population age. We argue that cousin marriage may indicate low levels of trust, DRD4 implies a fast Life History strategy, and young median age is associated with many factors predicting positive ethnocentrism.

ICAR5: a 5-item public domain cognitive test
Speaker: Julius Daugbjerg Bjerrekær

A 5-item abbreviation of the ICAR (International Cognitive Ability Resource) 16-item sample test was created thru exhaustive search. The 5-item version (ICAR5) was optimized for correlation with the 16-item version and for administration time. To validate the test, it was given to students in 6th to 10th grade in two Danish schools (N=236). Age was used as a criterion variable and showed the expected positive relationship (r=.43). Results furthermore showed that the abbreviated test was too difficult for the younger students (6th and 7th grades), but not for the older students. One item was found not to be very discriminative, so it should be replaced with a more suitable item.

Biogeographic Ancestry and Socioeconomic Outcomes in the Americas: a Meta-analysis

Speaker: Emil O. W. Kirkegaard
Co-authors: John Fuerst

A meta-analysis of American studies reporting associations between socioeconomic outcomes (S outcomes) and biogeographic ancestry (BGA) was conducted. 41 studies yielded a total of 167 datapoints and 57 non-overlapping effect sizes. European BGA was found to be positively associated with S outcomes r = .16 [95% CI: .12 to .20, K=23, N=20,837], while both Amerindian and African BGA was negatively so, -.12 [-.18 to -.06, K=17, N=15,870] and -.10 [-.16 to -.04, K=17, N=24,142], respectively. There was considerable cross-study variation in effect sizes (mean I^2=90%), but there were too few datapoints to permit credible moderator analysis. Implications for future studies are discussed.

Publication bias: An exploratory meta-analysis

Speaker: Jan te Nijenhuis
Co-authors: Xavier Macdaniel

The tendency to publish studies with significant results far more often than studies with non-significant results is called publication bias and threatens the validity of scientific disciplines. Even though there is sufficient reason to believe psychology is affected by publication bias, it has only scarcely been examined within our discipline. The present research therefore examined if publication bias is present within a collection of psychological meta-analyses and to what extent. Additionally, the presence of publication bias on the right side of the mean and liberal bias were examined. The present research applies publication bias analyses to 109 meta-analyses published in *Psychological Bulletin* between 2006 and 2014. The cumulative size of the study ($k = 8,703$; $N = 3.5^+$ million) makes it possible to cautiously assume the findings can be applied to the rest of psychology as well. The analyses used are the *funnel plot, trim-and-fill*-analysis, *Begg and Mazumdar's rank correlation test,* and *Egger's test of the intercept.* The results indicate that 33% of the 109 examined meta-analytic datasets show evidence of publication bias. Additionally, for 60% of the datasets the originally reported average effect size appears to be inflated or deflated by more than 20%, which is considered to be at least a moderate effect. The present research also showed evidence of publication bias on the right side of the mean for 24% of the datasets. Clear evidence for liberal bias was not found.

Functional architecture of visual emotion recognition ability: A latent variable approach

Speaker: Gary Lewis

Emotion recognition has been a focus of considerable attention for several decades. However, despite this interest, the underlying structure of individual differences in emotion recognition ability has been largely overlooked and thus is poorly understood. For example, limited knowledge exists concerning whether recognition ability for one emotion (e.g. disgust) generalizes to other emotions (e.g. anger, fear). Furthermore, it is unclear whether emotion recognition ability generalizes across modalities, such that those who are good at recognizing emotions from (for example) the face are also good at identifying emotions from non-facial cues (such as cues conveyed via the body). The primary goal of the current set of studies was to address these questions through establishing the structure of individual differences in visual emotion recognition ability. In three independent samples (Study 1: n=640; Study 2: n=389; Study 3: n=303) we observed that the ability to recognise visually-presented emotions is based on different sources of variation: a supra-modal emotion-general factor, supra-modal emotion-specific factors, and face- and within-modality emotion-specific factors. In addition, we found evidence that general intelligence and alexithymia were associated with supra-modal emotion recognition ability. Autism-like traits, empathic concern, and alexithymia were independently associated with face-specific emotion recognition ability. These results 1) provide a platform for further individual differences research on emotion recognition ability, 2) indicate that differentiating levels within the architecture of emotion recognition ability is of high importance, and 3) show that the capacity to understand expressions of emotion in others is linked to broader affective and cognitive processes.

The Welfare Trait: how state benefits affect personality.

Speaker: Adam Perkins

The welfare state has a problem: each generation living under its protection has lower work motivation than the previous one. In order to fix this problem we need to understand its causes, lest the welfare state ends up undermining its economic and social foundations – and endangering those of the nation as whole. In The Welfare Trait, I present data that suggest welfare-induced personality mis-development is a significant part of the problem. I base this theory on the discovery that childhood disadvantage promotes the development of an employment-resistant personality profile that is characterised by aggressive, antisocial and rule breaking tendencies; tendencies that in the jargon of personality research signify relatively low scores on the major personality dimensions of conscientiousness and agreeableness. The conclusion then, is that the of a welfare state which increases the number of children born into disadvantaged households will erode the nation's work ethic by increasing the proportion of individuals in the population who possess an employment-resistant personality profile due to exposure to the environmental influence of disadvantage in childhood.

Population genetics in intelligence research: How much can it help to retrace the evolution of intelligence?

Speaker: David Becker
Co-authors: Heiner Rindermann

The inequality of national, ethnical, cultural or racial defined human populations in intelligence was tried to explain in different ways. Although, inside this issue, we are facing a multi-causal problem, genetic factors are taken into account of many researchers as a more or less important factor. Several theories (cold winter, evolutionary novelty, Neolithic revolution, differential K) about influences of environmental conditions on the evolution of intelligence have been proposed, however, no genes have been found to explain bigger parts of intelligence variations on the individual level hitherto, thus the empirical tests of these theories is difficult. In our talk we want to communicate our ideas and results from the use of methods from population genetics. In the first part, we want to show to the audience how genetic variations, called genetic "distances" between today's populations can partly explain their differences in intelligence, also by taking into account geography, climate and social development variables. Part two includes a look behind these genetic distances and on prehistoric human migration. There we found a pattern we called "cold Siberia hypothesis" which should be demonstrated, explained and brought up for discussion. This also includes an outlook on planned future work and research.

Structural Equation Modeling with Neuropsychological Data from an Epidemiological Field Study in the Faroe Islands

Speaker: Fróði Debes

Co-authors: Arne Ludvig, Mariann Ellendersen, Katrin Reinert, Anna Sofía Veyhe, Pál Weihe, and Philippe Granjean

Epidemiological researchers, who study negative effects of neurotoxic substances on the central nervous system, have often used very different and non-overlapping cognitive tests and test batteries, thereby impeding across-study comparisons. The Cattell-Horn-Carrol (CHC) taxonomy has been suggested as an empirically based general framework for describing the structure of the universe of human mental abilities in populations that also provides a map to guide the handling of varied and heterogeneous cognitive outcomes (ISIR conference 2013. Symposium 3). In latent variable theory, meaningful theoretical constructs can be measured and be more easily compared across studies, also when studies have used different test outcomes. This is made possible by the fact that latent constructs are considered independent of their indicators. By this approach, the tendency to make use of arbitrary groupings of tests when attempting data reduction can also be avoided.

The immediate purpose of the work to be presented is to build a model that will enable examination of neurotoxic exposure effects on first-order and second-order CHC- factors in the Faroese cohort 3, and in turn to enable a future conduction of a meta-analysis based on the Faroese cohorts 1, 2 and 3. The broader aim is to provide comprehensive, coherent and empirically based methods from differential psychology when psychological measurement is applied in other disciplines, like in medical epidemiology, and to stimulate other studies to model their data within the same analytical framework for easier comparison of findings, thereby also improving the opportunities to perform meta-analyses based on different international studies.

The Faroese birth cohort number 3 consists of 656 children, including 7 twins. The cohort was assembled over 27 months from late November 1997. Levels of exposure to prenatal methylmercury were obtained from analyses of cord blood samples from 603 children, from cord tissue of 108 children as well as hair samples, collected at delivery, from 634 mothers. In addition, levels of prenatal selenium were obtained from cord blood samples from 607 children. By the age of 7½ years (range 7.05 to 7.86), 580 children were neuropsychologically tested over a period of 22 months starting from the end of August 2005. First, an attempt will be made to build a confirmatory factor analytic (CFA) measurement model, in accordance with CHC-theory, from the battery of neuropsychological tests that were originally selected from a different theoretical perspective (multiple single tests supposed to measure specific neuropsychological functions) and that did not include latent variables or a general factor of mental abilities. Some tests were added to the original test battery in advance of the examinations in order to facilitate the CFA option in later analyses. Secondly, a preliminary structural equation model (SEM) will be presented by adding a latent measurement model for the prenatal exposure to methylmercury and letting this exposure model have an effect on the latent measurement model for mental abilities. Thirdly, correction for relevant confounders will be added to the SEM. Preliminary results from ongoing analyses will be presented.

Openness to Experience Predicts Leftism in the Right Tail of Intelligence

Speaker: Noah Carl

Individuals with liberal or leftist views are overrepresented in academia in both the UK and the US. One possible explanation is that cognitively elite individuals who identify as liberal or leftist tend to score high on the personality trait openness to experience, which predisposes them toward intellectually stimulating careers, such as academia. In two separate studies, one based on British data and one based on American data, this paper provides the first direct test of this hypothesis. It finds that: intelligence cannot explain any of the overrepresentation of leftist views in academia in the UK; openness to experience consistently predicts leftism in the right tail of intelligence in both the UK and US; openness to experience does not consistently predict social liberalism in the right tail of intelligence in either the UK or the US. Overall, intelligence and openness to experience interact to explain part of the overrepresentation of leftist views in academia. Candidate explanations for the remaining overrepresentation are briefly reviewed.

Sex differences in brain size do translate into difference in general intelligence: Findings from the Human Connectome Study

Speaker: Dimitri van der Linden   Co-author: Curtis S. Dunkel

Characteristics of the brain such as its general size, the density of neurons, and the proportion of gray and white matter have been shown to relate to cognitive abilities. For example, an extensive meta-analysis of Pietschnig et al. (2015) showed that, in the population, the correlation between brain size and general intelligence is around $r = .24$. Studies on brain morphology revealed that gray matter correlated more strongly with general intelligence than white matter (Narr et al., 2007; Posthuma et al., 2002). Sex differences in brain size and morphology have also been shown. Males have bigger brains than females and this difference remains even after controlling for body size. Such findings yielded the question whether there would also be sex differences in intelligence. Although, it was initially believed that males and females did not differ on general intelligence, in 1994 Lynn argued that in adult populations there is indeed a sex differences in intelligence of somewhere around .3 standard deviation, which translates in 3 to 5 IQ points. Moreover, he argued that such findings are related to sex differences in brain size. In a more recent study, Burgaleta et al. (2012) replicated sex differences in brain size, operationalized as the sum of Gray and white matter volumes measures. They found that those differences in brain size were accompanied with sex differences in a limited set of cognitive abilities, such as spatial ability, with males scoring higher. However, they did not find sex differences in general intelligence. Subsequently, they argued that dissimilarities in brain size and morphology (gray and white matter) mainly caused sex differences in specific abilities. Burgaleta et al. acknowledged several limitations in their study such as a limited sample size (N was 100) and the use of undergraduate psychology students as participants. Therefore, in the present study we aimed to test sex differences in brain size and intelligence, using a much large population sample. More specifically, we analyzed the brain imaging findings and cognitive ability tests of the Human Connectome Project (Marcus, et al., 2011; Van Essen, et al., 2013). We used the newly released data that included 900 healthy young adults. In line with the previous study of Burgaleta et al, we operationalized brain size as the sum of all gray and white matter, but in addition we also analysed intracranial volume. General intelligence was operationalized as the first unrotated factor extracted from a range of cognitive ability measures. Analyses of brain size were conducted controlling for height.

In the total sample, brain size volume, intracranial volume, and gray and white matter volume showed direct and positive correlations with general intelligence ranging from .16 (white matter) to .26 (intracranial volume). Sex differences in brain size were replicated ($F(1, 892) = 157.51$, $\eta^2 = .15$, $p < .0001$ and $F(1, 892) = 164.28$, $\eta^2 = .16$, $p < .0001$, for brain size and intracranial volume, respectively). Importantly, we also found a significant sex difference in general intelligence ($F(1, 885) = 13.42$, $\eta^2 = .02$, $p < .01$). In terms of Cohen's d, the effect size was .28 which would translate to a difference of approximately 4 IQ points, and is in line with the literature.

Based on the findings from this study, we conclude that sex differences in brain size do seem to be accompanied with a difference in general intelligence. As such, the previous findings of Burgaleta et al. (2012) may have likely been due to sample characteristics such as sample size and restriction of range.

The Co-Occurrence Nexus Hypothesis

Speaker: A.J. Figueredo

Co-authors: Michael Anthony Woodley of Menie, Heitor B. F Fernandes,
Mateo Peñaherrera Aguirre, Candace Jasmine Black.

A co-selected suite of traits should be identifiable as a "Co-Occurrence Syndrome" or "Nexus" of temporally-covarying traits whose co-occurrence had previously been systematically favored by the predominance of group selection throughout the "Little Ice Age" (ca. AD 1350-1850), but have been systematically disfavored by the predominance of individual selection during the past 200 years of "Global Warming". Fifteen hypothesized Nexus indicators (ranging from AD 1810-2010) were each individually standardized then entered as parallel measures into a Multi-Level Model (MLM), using SAS PROC MIXED, with unstructured (UN) residual covariances, random intercepts, and restricted maximum likelihood (REML) estimation. Three Level 2 Chronometric SubNexus Clusters, Somatic Modifications *(s.m)*, Specialized Abilities – Environmental *(s.e)*, and General Intelligence – Heritable *(g.h)*, were used as a grouping factor for Level 1 Chronometric SubCluster Indicators (*s.m:* Male Fluctuating Asymmetry, Sinistrality prevalence, BMI, Height, and Brain Weight; *s.e:* GDP Per Capita, Concretization in Language Use, Forwards Digit Span, Psycholinguistic Easy Word Usage, and WORDSUM Easy Word Usage; *g.h:* Altruism Word Usage, Male SRT, Backwards Digit Span, WORDSUM Hard Word Usage, and Macro-Innovation Rate Per Capita). Nested model comparisons were performed between an three alternative MLM specifications: (1) an unconditional Nexus model, estimating a single intercept and a single logarithmic slope for all SubNexus Clusters and Indicators over time, as well as the same intercepts and logarithmic slopes for all SubCluster Indicators nested within each SubNexus Cluster; (2) a somewhat less restricted model estimating a separate intercept and a separate logarithmic slope for each SubNexus Cluster over time, but the same intercept and logarithmic slopes for all SubCluster Indicators nested within each SubNexus Cluster; and (3) an even less restricted models instead estimating a separate intercept and a separate logarithmic slope for each SubCluster Indicator over time within each SubNexus Cluster. The differences between hierarchically nested models were statistically significant due to the aggregate sample size, but the differences in squared multiple correlations were not very large in magnitude, indicating that most of the cross-temporal covariation was shared in common among the SubNexus Clusters (64.5%) in comparison with the proportions that were specific to each SubNexus Cluster (1.8%) and those that were specific to each SubCluster Indicator (5.9%). These patterns of cross-temporal covariation generally support the hierarchically-structured *Nexus Model* of the "Co-Occurrence Syndrome" and suggest that selection may be acting jointly upon these observed historical trends in the theoretically-expected directions.