May 11, 2020 newsletter. Dear Grey House team and esteemed colleagues,

68 days into this strange team-building adventure. We've left behind the stages of "oh joy, working from home!", "horrors, working from home!", "stimulation-seeking through cooking", "what's in my backyard?", "stay-at-home DIY projects" and even last week's stage of "if I could go somewhere, where would it be?", in which we sadly came to grips with our summer vacations being cancelled (frown).

Now arguably we are all settled into doing our work well, day to day, at a measured pace, and conscientiously taking plenty of personal time for *Rest and Relaxation*. Science marches on. Our bench in the Chesterfield Building is slated to open next week, but only for essential lab activities. Duke administration says office work might possibly re-open six weeks later, early July.... "depending." NZIDI secure data lab is open, for only one analyst at a time.

Of interest, the chart below shows that in the first 4 months of 2020, nearly 1200 articles were published in scientific and medical journals with the keyword "coronavirus." This is more than in any full year since 1960. And the scientific community's mobilization has been far faster than the scientific response to SARS and MERS coronaviruses. Those epidemics did stimulate research, but with more time lag.



Science of the times

Number of scientific articles mentioning "coronavirus"

The Economist

Meanwhile, I will share news now and then to keep us all on the same page, approximately weekly-ish. Here is the all the news I have that's fit to print since 4 May:

FIRST THE HAPPY NEWS! There is lots this week, and it's really good.

Madeline Meier was awarded tenure at Arizona State Univ. HURRAH! She is now Associate Professor. For congratulations: Madeline Meier <u>Madeline.Meier@asu.edu</u>



Idan Shalev was awarded tenure at Pennsylvania State Univ. FANTASTIC! He is now Associate Professor. For congratulations Idan Shalev <idanshalev@gmail.com>



Kyle's FiveThirtyEight article is up! It looks awesome! He worked with Nationwide



cell-phone data show how social distancing is working. Kyle says: "A bit more political than I would have been on my own and the language is a little imprecise, but I think the point we make is a good one. And man do I love that figure." This should set the stage for Kyle's second article looking at states that are reopening and how it

affects movement, planned for next week. <u>https://fivethirtyeight.com/features/americans-</u> <u>didnt-wait-for-their-governors-to-tell-them-to-stay-home-because-of-covid-19/</u>

Dan's paper on the DunedinPoAm came out this week! The Author's Accepted Manuscript was posted by the journal, awaiting the printed final copy. Belsky DW, et al. Quantification of the pace of biological aging in humans through a blood test: The DunedinPoAm DNA methylation algorithm. <u>*eLife*</u> <u>https://elifesciences.org/articles/54870</u>

Duke Office of Licensing and Ventures continues to make progress on developing DunedinPoAm as an exportable and licensable technology. More about which later.

Stephanie d'Souza worked inside the secure datalab in Auckland on Friday, hurrah, hurrah! Barry & Steph can now enter one at a time to work with Leah on NZIDI projects.

A lovely news story about little p came out in *Nature* this week: *The Hidden Links Between Mental Disorders*, by Michael Marshall <u>https://urldefense.com/v3/_https://www.nature.com/articles/d41586-020-00922-</u> 8 ;!!OToaGQ!4JTWhaE6N2VbNUPuhDDYRZmRLGIMsomNhLkFuTEFvN-axGca-L1Zww03JWctq7K-gaoFGA\$

HAPPY BIRTHDAYS	MAY	
Susan		29-May
	JUNE	
HonaLee		4-Jun
Jasmin		14-Jun
Aaron		25-Jun

NEXT, THE UNHAPPY NEWS:

Avshalom turned 60.

Before





Healthy Aging Highlights

Information on healthy aging & more from the National Institute on Aging at NIH

After

Science visualizations:

Time to include more science in our newsletters. Here goes....

A. **Pat Motsavage** made this lovely figure, showing how mental disorders tend to affect people before medical diseases do. Based on Mayo Clinic data, this figure will appear in **Leah's** next paper from the NZIDI.



B. This cool figure designed by Annchen Knodt appears in Maria Gehred's new paper. It shows that Dunedin study members who experienced ACES (adverse childhood experiences) tend as 45 year olds to have smaller subcortical brain structures. However, if the ACEs were retrospectively reported, this underestimates the size of brain effects, and findings are really only there for SM's whose retrospective recall is confirmed in the study's prospective childhood records. In contrast, when ACEs were ascertained prospectively, effects are larger, and do not depend on whether Study members recalled and reported their ACEs as adults. Prior studies examined only the amygdala or hippocampus, but Maria found that many more brain structures are involved.



 Prospective ACEs
 Prospective ACEs
 Retrospective ACEs

 (controlling for retrospective ACEs)
 (controlling for prospective ACEs)

C. **Pat Motsavage** made this figure for **Temi and Av's** essay on how social/behavioral science is benefitting the geroscience agenda.

GOAL	CHALLENGE	IMPORTANCE FOR CLINICAL TRIALS
Translate animal models to humans	Human aging has unique causes (e.g., conscientious personality, health behaviors, cognitive ability, education, social connectedness, adverse childhood experiences, mental illness)	Uniquely human social/ behavioral causes of aging also influence clinical-trial success (i.e., participation, adherence, drop-out)
Recruit young to midlife trial participants in time to prevent organ damage	Many social/behavioral causes of human aging begin early in life	Slowing aging before organ damage may be easier than reversing aging after organ damage
Develop measures of pace of aging for young to midlife trial participants <	Clinical endpoints of disease and death are too far in the future	New outcome measures for testing treatment effectiveness of gero-protective prevention trials
Assess if trial participants' pace of aging is slow or fast at baseline	Slow agers at ceiling may be unable to show benefit; fast agers may be treatment-resistant, or treatment-sensitive	Pre-register statistical analyses of baseline pace of aging as a moderator of treatment effect within trial arms, or pre-select trial participants to reduce heterogeneity in pace of aging
Bring the benefits of geroscience to people who need it most	Disadvantaged groups age fastest, die youngest, and are unlikely to participate in trials	To extend healthspan population-wide, gero- protective treatments cannot be restricted to the privileged few

If you have a great visualization, send it for future newsletters.

SPECIAL EDITION: PHASE-45 PROGRESS REPORT

Below is the amazing work we have accomplished as a team reporting new data from Dunedin Phase 45. It's only been a year since the last study member was seen in April 2019!

FIRST PHASE-45 PAPER: Rasmussen Line Jee Hartmann, et al. (2019). Association of neurocognitive and physical function with gait speed in midlife. <u>JAMA Network Open</u>

Elliott, Maxwell L., et al. (2019). A Polygenic Score for Higher Educational Attainment is Associated with Larger Brains. <u>Cerebral Cortex</u>

Elliott, Maxwell L, et al. (2019). General functional connectivity: Shared features of resting-state and task fMRI drive reliable individual differences in functional brain networks. <u>Neuroimage</u>.

Elliott, Maxwell L et al. (2019) Brain-age in midlife is associated with accelerated biological aging and cognitive decline in a longitudinal birth-cohort. <u>Molecular Psychiatry</u>

Carlisi, Christina O., et al. (2020). Associations between life-course-persistent antisocial behavior and brain structure in a longitudinal birth cohort. <u>Lancet-Psychiatry</u>

d'Arbeloff, Tracy, et al. (2020). White Matter Hyperintensities are Common in Midlife and Associated with Cognitive Decline. <u>Brain Communications</u>

Caspi[,] Avshalom et al. (2020). Longitudinal assessment of mental disorders and comorbidities across four decades among participants in the Dunedin birth cohort Study. <u>JAMA-Network Open.</u>

Belsky DW, et al. (2020). Quantification of the pace of biological aging in humans through a blood test: The DunedinPoAm DNA methylation algorithm, <u>eLife</u>

Romer, Adrienne L et al . (in press). Replicability of Structural Brain Alterations Associated with Transdiagnostic Risk for Mental Illness: Evidence from a Population-Representative Birth Cohort. <u>Molecular</u> <u>Psychiatry</u>

Romer, Adrienne L., et al. (in press). A pervasively thinner neocortex is a trans-diagnostic feature of general psychopathology. <u>American J of Psychiatry</u>

Elliott, Maxwell and Knodt, Annchen et al. (in press). What is the test-retest reliability of common task-fMRI measures? New empirical evidence and a meta-analysis. <u>Psychological Science</u>

Cheung, Carol Y. et al. A Deep Learning System for Retinal Vessel Caliber Measurement to Predict Cardiovascular Disease. Submitted to <u>Nature BME</u>

Wertz, Jasmin et al. (in review). The vital personality and healthy aging: Replicated life-course evidence about measurement, correlates, and familial transmission. Submitted to <u>Social Science and Medicine</u>

Demange, Perline A., et al. (in review). Investigating the Genetic Architecture of Non-Cognitive Skills Using GWAS-by-Subtraction. Submitted to <u>Nature Genetics</u>.

Rasmussen, LJ, et al. (in review). Association between elevated suPAR, a new biomarker of chronic inflammation, and accelerated aging. submitted <u>J Gero Med</u> R&R

Bourassa, Kyle J., et al. (in review). Intimate partner violence and lower relationship quality are associated with faster biological aging. <u>Psychology and Aging *R&R*</u>

Bourassa, Kyle J. et al. (in review). Lower cardiovascular reactivity is associated with more childhood adversity and poorer midlife health: Replicated findings from the Dunedin and MIDUS cohorts. <u>Clinical Psych Science</u>

Baldwin, Jessie R. et al. Population versus individual prediction of poor health from Adverse Childhood Experiences (ACEs) screening. Submitted

Reuben, Aaron, and Elliott, Maxwell L et al. Association of childhood lead exposure with structural brain integrity in midlife. Association of childhood lead exposure with structural brain integrity in midlife. Submitted.

Richmond-Rakerd Leah et al., Self-control and preparation for aging (mock review complete)

Darbeloff Tracy et al., Fitness and brain structure (mock review complete)

Maria Gehred et al, Long-term neurobiological embedding of adverse childhood experiences: a populationrepresentative birth cohort followed for five decades. (started mock review this week).

Projects using Phase 45 data that are underway and making good progress on the march toward mock review:

Max Elliott & Avshalom Caspi, Phase 45 PoA Jasmin Wertz, Little p and aging Jasmin Wertz, parenting genomics in multiple cohorts Kyle Bourassa and Line Rasmussen, stressful life events and suPAR Max Elliott & Line Rasmussen, brain and suPAR Karen Sugden, education and aging Geli Ronald and Lizzie, Autism Q and p Franky Happe and David, Autism Q and midlife health Wendy Slutske and Leah, gambling over the lifecourse



Re-opening Grey house? Remember our nice office?

Duke University has not yet informed us of plans for return to campus; as of Friday May 8 faculty were told offices *may* open in 6 weeks. Therefore, let's begin thinking about how we might re-open *safely*. This will be an ongoing process, but here are some ideas to start pondering. Our great luck is that Grey House is near-perfect for safe working.

- Whether to return or stay at home must remain a personal choice for each of us. Organisations are reporting an age divide, where younger staff are more keen to return to the workplace, but older staff are more reluctant. An age divide makes sense, for a number of reasons. We will need to allow for personal choice. And the choice may shift day to day, according to whether we feel robust or unwell. We will need a way of communicating our schedules to each other.
- 2. We will also need to achieve a level of trust in each other about safety outside of work hours. Some isolate hardcore, others go out and about. This has caused *major conflict* in families, and we don't want it to bring conflict to our team.
- 3. Office environments with private offices, as opposed to open-plan, are known to be safest. Thank God we have them. We may need a one-person-per-office policy. Think about whether you wish to move.
- 4. One-way halls prevent face-to-face encounters that are less than 6 feet apart. We may need to implement arrows directing ourselves to use the circular hallway inside our suite in a clockwise direction. How? (Luckily, there's no elevator!)
- 5. Our large meeting room could hold a maximum of 4 persons at a time, several feet apart, in designated chairs. Other chairs could be removed. To where?
- 6. What about the kitchen? My thinking is that we probably should not use it, but I am open to ideas. Coffee, or no coffee? How can we work without coffee?!?!?!?



- 7. Better home workstations. Many of us fled home with nothing but a laptop. It's time for you to make sure that if you plan to work from home for an extended period, you have an ergonomically supportive desk and chair. We can help with monitors and keyboards and mice and stuff. Let me know.
- 8. Masks. Yes or no in the office? I have been told the P&N Dept will supply these.
- 9. Handwashing stations. We will need to secure a stash of Purell and post it at the front and back doors and in each bathroom. How can we get this?
- 10. Cleaning our own offices. The building cleaners live in reduced circumstances and crowded homes, and virus can live 48 hours on surfaces. Which to me suggests we should have Clorox wipes in our rooms, to wipe down our work surfaces each morning. Again, how can we get 15 cannisters of these wipes?
- 11. Ditto the bathroom surfaces. We are lucky we have our own private bathrooms.
- 12. Sun. Carolina has loads of it, and it kills virus, just ask the President. Instead of sitting nose-to-computer in our offices all morning, each team member should endeavor to spend at least 15-20 minutes outdoors in the sun between 8am and noon each workday.



RESEARCH-PROJECT PROGRESS SINCE 4 May:

New CP from Jessica Agnew-Blais: Genetic and early environmental risk factors for childhood ADHD symptoms in a population-based cohort Proposed co-authors: Louise Arseneault, Daniel Belsky, Avshalom Caspi, Andrea Danese, Cathryn Lewis, Guilherme Polanczyk, Karen Sugden, Jasmin Wertz, Ben Williams, Terrie Moffitt

Maria Gehred's first-year project paper went out for mock review today, YAY! Due the beginning of June. Long-term neurobiological embedding of adverse childhood experiences: a population-representative birth cohort followed for five decades.

Leah Richmond-Rakerd's manuscript on self-control **finished mock** review last week. Thanks to all for the great reviews, especially Adam and Sean.

Tracy Darbeloff's manuscript on fitness and brain **finished mock** review last week. Thanks again to all who sent great mock reviews.

Marieke De Bruine's paper is ready to submit this week. Unraveling the association between peer victimization and systemic inflammation.

Aaron and Max's paper was **submitted** last week: Association of childhood lead exposure with structural brain integrity in midlife. Fingers crossed it gets reviewed.

Jessie Baldwin's paper showing ACE's don't predict health at the level of the individual was submitted last week: Population and individual prediction of poor health from Adverse Childhood Experiences (ACEs) screening. Fingers crossed for review.

Line's paper got an R&R today! HURRAH! Association between elevated suPAR, a new biomarker of chronic inflammation, and accelerated aging. <u>J Gero Med</u> R&R

Tim Matthews got an R&R this week! HURRAH! This is what loneliness looks like: A mixed-methods study of loneliness in adolescence and young adulthood, <u>International</u> <u>Journal of Behavioral Development.</u> R&R

Kyle's paper is being revised for resubmission: Intimate partner violence and lower relationship quality are associated with faster biological aging. *Psychology and Aging R&R*

Jasmin's paper: Personality and healthy aging: Replicated evidence about life-course associations and familial transmission, is **in review** at *Social Science and Medicine*

Jasmin and Sophie von Stumm's first paper (a commentary) as part of their Jacobs Foundation grant, is **in review** at *NPJ Learning*.

Temi and Avshalom's Viewpoint essay: Behavioral and social science goals for the clinical geroscience agenda, is **in review** at *JAMA*

Jo Newbury's paper, Association between genetic and environmental risk for schizophrenia during upbringing in a UK longitudinal cohort, is **in review** *Psych Medicine*.

Kyle's paper, Lower cardiovascular reactivity is associated with more childhood adversity and poorer midlife health: Replicated findings from the Dunedin and MIDUS cohorts. **in review** *Clinical Psychological Science.*

Kyle's paper is still in review: Bourassa, Financial Stressors During the Great Recession and Mortality. *Psych Science*

Line's paper is still in review: Association between elevated suPAR, a new biomarker of chronic inflammation, and accelerated aging. *J Gerontology, Med Sci*

JC's paper still in review: The development of perceptions of punishment risk from adolescence to middle adulthood. *Criminology.*

Jon Schaefer's paper still in review: No evidence for genetic moderation of the effects of adolescent victimization exposure on general psychopathology in the Environmental Risk Longitudinal Twin Study. *J of Abnormal Psychology*

Temi's paper still in review: Behavioral and social research to accelerate the geroscience agenda. *Aging Research Reviews*, R&R.

Antony Ambler, Renate, Maria, and Annchen, thank you for your reproducibility stat checks on papers in mock review. Thanks to all for working together on this to make our publications error-free, reproducibility has become our hallmark!

Susan is coordinating the grant application submission of **Avshalom's** K07. She is also helping **Stephanie Langevin**. Susan is also working on visa extensions for Jasmin and Line. And estimating budget projections, out thru 2022.

Antony is working with **Jo and Becky** to finish the online survey of E-risk twins.

Renate is continuing the analyses of p across generations, and has started a new project on age of onset of mental illness.

Ben is getting our minus-80° tissue freezer fixed. He's also creating polygenic scores.

Honalee created a new scale that measures health behaviors: The Nyberg index. It is based on alcohol consumption, smoking, physical activity & BMI. The Nyberg study derived this index as the best predictor for future mortality/morbidity.

Honalee and Antony are making data sets galore, and managing incoming CPs and end-of-project documentations.

Leah and Signe and Barry and Stephanie started a new project, on deaths of despair.

Sean and Ness are coding the Dunedin study members' grandparent dementia data, while working at home in Portobello Bay.

Pat Motsavage is creating stunning visualizations for our publications. Thank you Pat!

Eli is taking seriously Temi's advice to get some rest. He read last week's newsletter.



I have tried not to inject much COVID19 information into our newsletters, but this firstperson narrative is excellent: "Finally, a virus got me." Scientist who fought Ebola and HIV in his career reflects on facing death from COVID-19 https://www.sciencemag.org/news/2020/05/finally-virus-got-me-scientist-who-fought-ebola-and-hivreflects-facing-death-covid-19# As always, if anyone feels unwell, in body or spirit, please let me know. Strict confidentiality is guaranteed, as is a home delivery of chicken soup, and chocolate chip cookies. Fondly, Temi



Parting shot:

If you did not get the Duke Daily today, you might love this little vimeo of the Cameron Crazies singing their "Everytime We Touch" theme song. No Duke basketball game at Cameron Indoor Stadium starts without a boisterous, bouncing sing-along to "Everytime We Touch" by Cascada. So it's appropriate that Duke students came together for a virtual ensemble version of the song, led by Cascada's Natalie Horler.



https://vimeo.com/415517108?utm_source=newsletter&utm_medium=email&utm_conte nt=Graduating%20to%20%27Everytime%20We%20Touch%27&utm_campaign=duked ailymay11_20