Mtg w/ Will

**ON JOB DECISION**

Ultimately decided to take this non-academic offer at Analysis Group…

I created a decision matrix between this and the Michigan offer and realized when I was making it:

We really like the area, appreciate the stability that comes from a more normal job, better for my family financially…. JUST ultimately not enough pulling me to Ann Arbor

NOT a position I really want forever either but it’s a decent off ramp to explore other options given how brutal the academic path can be

NOT SURE WHERE I WILL BE IN A COUPLE OF YEARS BUT COMFORTABLE WITH THIS DECISION

**On Dissertation**

Dempsey is “Physical activity volume, intensity, and incident cardiovascular disease” in the *European Heart Journal*

Good news:

**Sample of Results from Replicating Dempsey after fixing restricted cubic spline specification:**

|  |  |  |
| --- | --- | --- |
| **Physical Activity Energy Expenditure**  **Physical Activity Risk (Lower Risk = MORE Physical Activity)** | | |
| Physical Activity Energy Expenditure | *Adjusted HR (95% CI)* | *Dempsey Adjusted HR (95% CI)* |
| *15* | 1 (Reference) | 1 (Reference) |
| *20* | 0.95 (95% CI: 0.91, 1.00) | 0.88 (0.80-0.96) |
| *30* | 0.87 (95% CI: 0.76-0.99) | 0.73 (0.60-0.88) |
| *40* | 0.80 (95% CI: 0.67-0.97) | 0.69 (0.58-0.82) |
| *50* | 0.79 (95% CI: 0.66-0.94) | 0.64 (0.53-0.76) |
| *60* | 0.78 (95% CI: 0.63-0.97) | 0.60 (0.49-0.73) |

The Dempsey study on which much of this is modeled generally had stronger associations than we found. This makes sense given that we use coronary artery disease (a subset of CVD) as the outcome and they use cardiovascular disease as the outcome. Additionally, our sample is only about 75k individuals compared to 96k in Dempsey because we had to screen for individuals with high quality genetic data. Nevertheless, it does not appear that large statistical power differences exist (in part because of the similarly narrow confidence intervals). NOT A REPLICATION BUT NOT SUPPOSED TO BE.

We have established a reasonable relationship for overall PA VOLUME and incident CAD. We can now bring the composite risk of polygenic score and PA volume into the same model. Now we just have to do PA intensity.

1. Last big step in our analyses is to look at the effect of PA intensity on CAD risk HOLDING PHYSICAL ACTIVITY VOLUME CONSTANT
   1. Main issue here - Intensity and volume are naturally HIGHLY COLLINEAR (correlation = 0.69)
   2. Oddly enough, the VIF including PA and %MVPA was relatively minor… While it was higher than for other variables, ALWAYS below 5.. Which suggests it isn’t a massive issue
   3. How have others handled this question?
      1. Log and standardize PA in regression w/ MVPA and interact them (Strain et al)
      2. Interact the “four orthogonal spline variables” in a regression including PA and % MVPA (no transformations as far as I can tell) (Dempsey et al.)
      3. Compositional data analysis - Most rigorous and newest. One behavior can only increase at the expense of some other PA behaviors. Effective but a new rabbithole (Walmsley et al.)
   4. WEIRDNESS IN DEMPSEY RESULTS: (Simpson Paradox?)
      1. In **Table 3** of the paper, % MVPA has a consistent SIGNIFICANT effect at different PA levels on CVD risk.
      2. HOWEVER, in **Table S4** of the supplement, the authors perform same analysis sex stratified and get largely null results. Is this simply a statistical power issue? The effect sizes also look diminished.
      3. Why do I care? **BECAUSE MY ANALYSES ARE YIELDING RESULTS MORE IN LINE WITH TABLE S4**
2. Worth experimenting with percentile cutoffs? For now in our study, I’m using quintiles of genetic and PA risk for reference. I fear this could be too narrow/being done slightlly differently here (modeled continuously, so we’re looking at it at the THRESHOLD of these quintiles - right idea?). Considering also tertiles to match a lot of the literature that does NOT focus on modeling exposures continuously.

**SAMPLE FIGURE:**

**Figure 1: Forest Plot of Genetic and Overall PA and Risk of Incident CAD**

|  |
| --- |
| ***20th Percentile of PA vs 40th Percentile of PA***  Chart, box and whisker chart  Description automatically generated |

**On Residential Course**

TIMING FOR GRADES FOR BENEFITS AND RESPONSES (Plan is to finish responses today and benefits deliverable Friday)

HEURISTIC MOVING FORWARD??