Name: Milan

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Describe in a few sentences or bullet-point where the project is at.

Break it into i) writing and ii) data work/analyses.

1. Writing
   1. Solid outline of an intro—just need to add more details in certain places Yes I agree. It’s looking good. See comments.
2. Data Work
   1. Have all the data I need in a form I can work with
      1. What exactly? Think through this a tiny bit more.
   2. Z scores calculated for 83-86
      1. Good.
   3. Function that lowkey works to calculate Z scores from WHO reference sheets (91 and 94 data)
      1. Yes this has been pretty tricky. We can see if it really matters if it’s WHO reference or not. The issue is the age of the kids, right?

b) For each category (writing/analyses), what needs to be done next? Is there anything holding things up? How have we tried to solve this issue? What options are left?

i) writing

a. need to add more details: describe study better, add how many individuals were looking at, more stuff about epigenetic clocks

b. start methods section

Yes, see other papers we’ve written in that respect.

1. data work/analyses
   1. Finish calculating Z scores
   2. Potentially figure out a better way to calculate 91 / 94 because what I have now is not elegant
   3. Data visualization—make some figures

Outline the predictors and outcomes we’re thinking through for the models we will build. Try to rationalize what and why

|  |  |  |
| --- | --- | --- |
| Variable | Type | Reason |
| e.g. BMI | Predictor | BMI may affect our measure of DNAmAge in adulthood so we should control for it in our analysis of the effect of catchup growth early in life |
| Weight | Predictor | Way to measure catch-up growth in children. Type of weight is important though-- weight gain through increased adiposity predicts adverse health outcomes. Weight catch-up can also happen during a broader time interval (as opposed to height catch-up). Kids that recover from some type of faltering (malnutrition or disease induced ususually) seem to oftentimes have altered body compositions with increased adiposity and atrophic muscles. Can also exhibit down regulated immune function—not enough energy for maintenance= increased epigenetic age. Rapid weight gain in babies also associated with obesity risk (even childhood obesity) |
| Height | Predictor | Catch-up in height possible, but full growth potential might not be reached if faltering occurs during infancy. Babies born smaller still likely to be shorter adults even though they may grow at accelerated rates. This is because post-natal growth is exponential until about age 3. I think it’s gonna be important to look at both catch-up in height and weight together, because accelerated weight gain without accelerated height gain is indicative of substantial investment in current survival and early reproduction. Investing more energy into fat stores, especially for women, probably allows for buffered reproduction early at the detriment to future survival (smaller size, early senescence) |
| Skin fold thickness | Predictor | Measure of adiposity ^^ |
| Smoking  late life disease exposure,  Early cancer, | Predictor | May be hard to control for these things, but anything detrimental to health would probably accelerate epigenetic age, and confound results. |
| Sex |  | There are men in the study. Stratify based on sex. |

Any other thoughts, comments, ideas?

* Early menarche associated with AA for GrimAge (Are there diffs in age at menarche among catch-up growth girls? Not necessarily important, just interested)
* use GrimAge, PhenoAge, Horvath intrinsic, Hannum extrinsic (I think so too – we just need to rationalize a tiny bit why these are the go-to clocks)
* I’m going to read a paper on this but it seems like catch-up growth might impact muscle anabolism? – unconfirmed I’ll read more about this – interesting.
* Catch-up growth also increases oxidative damage and telomere loss in non-human animals – Yeah. You included this in the introduction, but I wonder if there might also be a reason to mention WHY we use epigenetic clocks over those? Main reason in my view is that they tend to be more accurate, stronger/better predictors of those outcomes.
  + Food insecurity does this as well, however diet restriction enhances maintenance. Re feeding after diet restriction causes more energy -> growth and less to maintenance (decrease lifespan)
* Catch-up growth selected for because long term health effects arise after reproduction (Yes, exactly. Good insight into the selective processes that could lead to catch-up growth, even though they are ‘costly’ to the individual)
* Were also looking at one specific type of catch up growth (accelerated growth)
  + Catch-up can also happen by extending the time to maturity
  + The adverse effects of accelerated growth made more extreme when growth occurs in a shorter period (ox damage/telomere loss in three spined sticklebacks)--
  + makes sense because more energy would have to be allocated to growth
  + Very good point. I wonder under what socioecological conditions we might expect this to happen? (I suspect bad conditions very early, but decent during childhood and adolescence. On the other hand, catchup growth may be something that just happens because it doesn’t “know” if conditions will get better, and the body just takes early adversity as a cue to grow faster).
* Catch-up growth measured through upward centile crossing, but we still need to define what counts
  + Yeah. I’d be very happy if we could just use Z-scores for our population and call it a day. These WHO reference panels are a pain.