Is health behavior ‘contagious’? (Christakis & Fowler, 2007)
Partners are similar in health and lifestyle.
How genes may help to test role of partner:
- Sample restrictions:
  - American of European descent
  - Exclude same-sex couples
  - Listwise deletion
  - On average +7 observations per individual/couple
  - N = 30,481 observations, 6,719 individuals, 3,337 couples

Main variables (for both partners in a dyad):
- weight PGS for BMI (Vengo et al., 2018 GIANT), R² = .7
  - first 10 principal components
  - BMI (lagged for the partner), sex, education,
  - age and age squared (lagged for the partner)
  - Interactions of age + age with ego’s sex, both education levels and ego’s PGS,
  - years in relationship, year of interview dummies

Health and Retirement Study

I) Social Genetic Effects (SGE)

Main findings:
- ego’s BMI predicted by both partner PGS for BMI
- Partner’s effect about 1/6 of ego’s
- Effect decreases somewhat but remains in subsequent models

SGE moderation?
- Spousal genetic influence on ego’s BMI is moderated by
  - gender (no)
  - spousal education (yes, increases effect)*
  - ego’s own education (yes, increases effect)
  - spousal age + age squared (no)
  - relationship duration (yes, increases effect)*
- No epistatic effects: No interaction with ego’s PGS
  * remain in fully interacted models and also when including similar interactions with own BMI

II) SGE: Results

III) SGE: Partner’s genes matter?

The partner’s matters, also his/her genetic-makeup
- Partner’s SGE remain even controlling for ego’s PGS
- Extends previous SGE findings (school friends, siblings) to long-term relationshps
- SGE larger if
  - spouse is better educated (power in relationship?)
  - longer lasting relationships (converge?)
- Future work: update PGS; explore other health behaviors

I) Causal social influence?
- Peer effects hard to identify: homophily, confounding, reverse causality. Previous research: longitudinal models
- Alternatively use MR, but standard MR not a solution
  - Does not solve gene-based homophily
  - New problems: pleiotropy, population stratification
- Credible MR?
  - gene-expression (by age + age²) as instruments (Vollenweider et al., 2014)
  - And fixed effects at couple/individual level

II: Effects of partner’s BMI (t-1)
- We replicate and extend previous work:
  - longitudinal dyadic models with lagged partner’s BMI
  - new controls for own genetic predisposition + gene expression by age
  - MR using gene-expression with individual/couple fixed effects

III) Credible MR?
- MR models also point to causal social influence processes but work-in-progress...
- Effect estimate have wide s.e.’s; lack of power
- Pleiotropy really controlled for?
  - Models also control for education * age interactions
  - Effects remain using PGS with different threshold (only genome-wide significant SNPs)