**Outline**

**Pubertal Development**

* Review literature on pubertal development in boys and girls and links to outcomes in adolescence, early adulthood, and mid-life.
  + Pubertal timing (i.e., the onset of puberty) demonstrates significant individual variability, with far reaching consequences for developmental processes.
  + In particular, early maturing girls have higher risk for mood disorders and externalizing behaviors such as delinquency, substance use, early sexual activity.
  + Both early- and late-maturing boys demonstrate elevated risk for depression and other internalizing behaviors
  + Comparatively, relatively little is known about the long-term impact of pubertal processes beyond adolescence and early adulthood but:
    - Some evidence suggests that links between pubertal timing and adverse outcomes are minimal by the fourth decade of life (Boden, 2011; Senia, 2018)
    - Other evidence suggests that risk conferred by early or off-time pubertal development persists into adulthood in certain domains (e.g., depression, sleep; Hoyt, 2020)
  + Understanding these links between pubertal processes and behavioral outcomes depends on measurement

**The Measurement of Pubertal Timing**

* What measures are available to measure pubertal timing?
  + Menarche (single indicator), self-report (e.g., PDS, peer relative timing measures), hormone measurements, physical exams
    - Can vary in terms of their objectivity (vs. subjectivity), whether they’re concurrent or retrospective, or whether they’re cross-sectional or longitudinal
  + Different measures have different strengths
    - Adolescents aren’t great at identifying early pubertal signs which can lead to regression through the stages (Tanner Stage 3 → Tanner Stage 2)
    - Some items in the PDS aren’t as reliable (e.g., skin changes; [Shirtcliff, 2009](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4251487/#R42))
  + Timing might be best assessed after puberty. Explain why.
* Retrospective pubertal measures
  + There are several measures available to assess retrospectively reported pubertal timing including retrospective PDS measures and a timing measure (Beltz & Berenbaum, 2013).
    - Psychometrically validated/assessed 🡪 Cronbach’s alpha, ICC, correlations with recalled age for menarche & spermarche, but not with prospective measurements or a separate dataset
  + Retrospective timing measures are a powerful tool.
    - Work with these retrospective measurements has revealed important insights into the persistence of mood disorders, substance use, and behavioral problems
  + But concerns about the use of these measures persist:
    - Reliability: high internal consistency at the time of assessment (see Beltz & Berenbaum, 2013), but what about test-retest reliability or reporting over time?
    - Validity: what is the role of recall bias 🡪 can’t look at validity because there’s no objective reports of pubertal development during adolescence

**What’s Known about the Reliability and Validity of Retrospective Reporting?**

* Review what sexual initiation and substance use studies tell us about reliability of retrospective reporting as a benchmark. Some key issues include:
  + Length of recall
  + Sex differences
  + Off-time/Regression to the mean
* Review menarche/timing studies (i.e., what gaps does our study fill?)
  + Marie & Jacobsen (2017): High reproducibility of menarche with long length between initial and retrospective report.
    - But both time points were retrospective
  + Gilger et al (1991): substantial test-retest reliability, MZ intraclass correlations exceeded DZ intraclass correlations, magnitude of relations followed theoretical expectations of traits with genetic influences
  + If many retrospective reports are taken at 18, then those might good reports
    - But only measured in adulthood
    - And small sample size
  + General limitations of these studies:
    - Both time points were retrospective
    - Both time points were in adolescence
    - Only menarche → no boys were assessed

**The Current Study**

* Compare prospective reports of status to a validated measure of retrospective pubertal timing using a large cohort of youth followed prospectively into adulthood
  + Aim 1: Examine the correspondence between prospective and retrospective reports of timing in boys and girls.
    - Compare these findings to sexual initiation
  + Aim 2: Examine whether prospective and retrospective reports of timing are differentially associated with outcomes.
  + Aim 3: Examine factors (moderate the accuracy of outcomes) associated with better or worse recall of outcomes (e.g., age, length of recall…)

**Methods**

**Participants**

**Measures**

**Analytic Plan**

**Results**

**Aim 1:** Examine the correspondence between prospective and retrospective reports of timing in boys and girls.

* Report means and zero order correlations for indicator (sexual initation, menarche, girls’ timing, boys’ timing) in text
* Figure 1a & 1b: Average sexual initiation and menarche by early, on-time, and late categories
* Figure 2c & 2d: Average sexual girls’ and boys’ timing by early, on-time, and late categories
* Figure 3. Correspondence between prospective and retrospective reports of timing.

**Figure 1b.** EXAMPLE menarche by early, on-time, and late categories

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Retrospectively Reported Menarche

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Figure 3. EXAMPLE Correspondence between prospective and retrospective reports of timing.

**Aim 2:** Examine whether prospective and retrospective reports of timing are differentially associated with outcomes.

* Figure 4. Depict outcomes using area plots (e.g., Beltz, 2014)

**Aim 3:** Examine factors (moderate the accuracy of outcomes) associated with better or worse recall of outcomes (e.g., age, length of recall…)

* Report in text

**Discussion**