Gender vs. pubertal development
Pubertal Development Moderates Hippocampal Volumes and Condom Use

**Right Hippocampus**

Condom Use Frequency (1-5)

<table>
<thead>
<tr>
<th>-200</th>
<th>0</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

**Left Hippocampus**

Condom Use Frequency (1-5)

<table>
<thead>
<tr>
<th>-200</th>
<th>0</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

Hippocampal Volume (mean-centered)

- Low PDS (-1 SD)
- High PDS (+1 SD)
Pubertal Development

Moderates Left Amygdala Volume and Condom Use

Condom Use Frequency (1-5)

Left Amygdala Volume (mean-centered)

Low PDS (-1 SD)  High PDS (+1 SD)

* Trend level in right amygdala (p = .078)
Reward structures?
No relationship for Nucleus Accumbens Volume and Condom Use
Diffusion Tensor Imaging (DTI)
Working model of adolescent sexual decision making

Feldstein Ewing et al., *AIDS & Behavior*, 2015
Messages for clinicians

• **Clinical interventions**
  - What does this work mean for *real-world, on-the-ground practitioners*?
    - Still unanswered – *nature of gender*:
      - Confound of correlation between gender and pubertal development scores = .4
        - High pubertal development scores being driven by girls
    And/or
      - Different prevention programming for younger vs. older adolescents

• **Understanding of neural mechanisms**
  - What does this work mean for understanding *mechanisms of risky sex in adolescence*?
    - role of reward vs. *social emotional systems*
      - in process - articulating the development of interventions to *social emotional processing*
Pieces that continue to feel under addressed
Existing prevention programs miss critical constructs.
Role of the provider in adolescent intervention programming

Figure 1. Model of indirect effects

- Youth Ethnicity (X)
- Therapist Behaviors (M)
- Youth Alcohol-Related Problems (RAPI) (Y)

1. Path a
2. Path b
3. Path c'
Issues in our conceptualization of risk
Adjustments we have made to our intervention manuals and measurement

1. At birth, what biological sex was assigned to you?
   - Male
   - Female
   - Intersex
   - Prefer not to answer

2. What is your gender? This may or may not match your assigned sex at birth.
   - Male
   - Female
   - Genderqueer/Gender neutral
   - Transgender
   - Other
   
   *If you selected transgender, please select one of the following:*
   - Female to Male
   - Male to Female
   - Transgender
   
   *If you selected other, please write in your preferred gender:

1. Which of the following statements is true for you? (Check all that describe you)
   - I am sexually attracted to people of the opposite gender
   - I have sex with people of the opposite gender
   - I am sexually attracted to people of my same gender
   - I have sex with people of the same gender
   - I am sexually attracted to people of both genders
   - I have sex with people of both genders
   - I am not sexually attracted to either gender
   - I do not feel comfortable answering this question

The following questions are for females who have had ever had a sexual encounter with another female. If these questions do not apply to you, please skip to question #17.
How to respond to that in the research and treatment realm
Adolescent sexuality and concepts of dating are much more fluid.
Move beyond

- Binary categories
- Forced choice
- Single option items

Ansara, 2015, JAH
By not being so limited, we can be more inclusive

- Also capture much more dynamic concepts of risk
  - Social emotional risk
  - Relationship development
  - Self image
Acknowledgements

**Funding:**
- 1R01NR013332-01 (MPIs: Feldstein Ewing and Bryan)
- 1R01AA023658-01 (PI: Feldstein Ewing)
- 1U01DA041148-01 (MPIs: Nagel, Feldstein Ewing, Fair, and Garavan)
- 1R13AA023455-01 (MPIs: Feldstein Ewing and Chung)
- 1R01 AA017878-01A2 (PI: Feldstein Ewing)

**Collaborators:**
- Angela Bryan – Co-PI
- Karen Hudson
- Francesca Filbey
- Hollis Karoly
- Rachel Thayer
- Sephira Ryman
- Lindsay Hylek
Neuroimaging and Psychosocial Addiction Treatment
An Integrative Guide for Researchers and Clinicians

Edited by
Sarah W. Feldstein Ewing
Katie Witkiewitz
Francesca M. Filbey
Questions?