The Context and Neurocognitive Correlates of Adolescent Sexual Risk

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Adolescence
Things that change during adolescence
Natural transition of social relationships
Initiation of sex is normative and developmentally appropriate.
Different from other adolescent risk behaviors
Requires steps to be safe

- Decision making around sexual intercourse requires some degree of foresight and advanced planning to be safe.
Risky aspects of adolescent sex

- Adolescents represent only **25%** of the sexually active population

- **47%** of teens have had intercourse
  - Only **41%** report using a condom
    - Teens account for **26%** of new HIV infections
      - Only **50%** are aware of their infection status
      - Rates are particularly elevated among
        - Youth of color
        - Youth involved in the justice system
Prior research disaggregating predictors of risky sex
Parent behaviors – Parent Monitoring

Karoly… Feldstein Ewing, 2016, JPP
Individual difference variables – Positive Outlook

Schmiege, Feldstein Ewing et al., 2011, HER
Health beliefs – anticipated likelihood of using condoms

Female Participants

Likelihood of condom use

- Low Trust
- High Trust

Male Participants

Likelihood of condom use

- Low Trust
- High Trust

Feldstein Ewing & Bryan, 2015
Biological Factors – T Cadherin alleles

CDH13 (rs4389131) x Parental Monitoring (PM) on Age of First Drink.

CDH13 (rs12926331) x Peer Alcohol Use (Peer Use) on Age of First Intercourse.

Feldstein Ewing et al., 2014
Need for more sensitive metrics

Feldstein Ewing et al., 2015; Addiction; Feldstein & Miller, 2007, Addiction; Feldstein Ewing et al., 2009, 2011; ACER
Brain as a vehicle of decision-making in the context of adolescent risky sex
Measurement in fMRI

Karoly et al., 2015, DCN
Patterns of adolescent neurodevelopment

Giedd & Rappaport, 2010, Neuron
Response Inhibition

Negative association between past month alcohol and cannabis use in IFG and R Insula

Positive association between past month risky sex in IFG and middle occipital gyrus

Feldstein Ewing et al., 2015, Addictive Behaviors
Network Connectivity

Network connectivity strength of dDMN associated with initial and longitudinal alcohol use, but not risky sex

Thayer et al., 2014, Curr HIV Res
BART Task

Claus & Hutchison, 2012, ACER; Magnan et al., 2013, J AIDS Clin Res
Decision making around adolescent risk behavior is highly complex.
Function vs. structure
MRI with high risk youth
Project DASH
Anticipated Relationships

- We expected to see relationships between brain structure and frequency of condom use across:
  - Emotional areas (limbic system: hippocampus, amygdala)
  - Reward areas (nucleus accumbens)

- We expected to see gender differences in these relationships
### Sample Demographics

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Females (n = 38)</th>
<th>Males (n = 91)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
<td>13%</td>
<td>11%</td>
</tr>
<tr>
<td>African-American</td>
<td>0%</td>
<td>7%</td>
</tr>
<tr>
<td>Hispanic-American</td>
<td>58%</td>
<td>54%</td>
</tr>
<tr>
<td>AIAN</td>
<td>8%</td>
<td>2%</td>
</tr>
<tr>
<td>Multi-Ethnic</td>
<td>21%</td>
<td>24%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Females</th>
<th>Males</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-18</td>
<td>15.79 (1.17)</td>
<td>16.12 (1.16)</td>
<td>-1.62, p=0.11</td>
</tr>
<tr>
<td>Grade</td>
<td>8.97 (1.37)</td>
<td>9.20 (1.09)</td>
<td>-1.02, p=0.31</td>
</tr>
<tr>
<td>Freq. of Intercourse</td>
<td>2.84 (1.62)</td>
<td>3.32 (1.53)</td>
<td>-1.76, p=0.08</td>
</tr>
<tr>
<td>Freq. of Condom Use</td>
<td>3.16 (1.20)</td>
<td>3.43 (1.14)</td>
<td>-1.30, p=0.20</td>
</tr>
<tr>
<td>Pubertal Development Score (PDS)</td>
<td>3.51 (0.49)</td>
<td>3.05 (0.48)</td>
<td>4.76, p&lt;0.001</td>
</tr>
</tbody>
</table>

1. A few times a year -- Almost every day
2. Never -- Always
3. Barely started -- Seems completed