Characterizing the Developmental Course and Turning Points for Alcohol Consumption, Heavy Drinking, Smoking, and Marijuana Use

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Introduction

• Substance use shows normative epidemiological age-related trends
  • Onset in the late adolescent to young adult years
  • Peak prevalences in emerging adulthood
  • Decreasing thereafter
• Inconsistency with regard to the timing of peak use
  • Peaks range across samples from ages 18 to 22
  • Reliance on cross-sectional data and/or data with relatively coarse age groupings
• Pinpointing the period of peak use would advance our knowledge of the epidemiology of substance use
  • Can use piecewise latent growth curve models (Cudeck & Harring, 2010)
  • Two growth phases separated by a knot (time point at which a response function transitions from one phase to another; Cudeck & Klebe, 2002)
  • Knot can be known a priori or can be estimated

Method

PARTICIPANTS
• National Longitudinal Survey of Youth 1997 (NLSY97) (N=8,984)
  • Initial cross-sectional sample of 6,748 adolescents representative of the general population
  • Supplemental sample of 2,236 youth, designed to oversample Hispanic and Black youth
• Age 12-18 at baseline (mean age 14.4)
  • 48.8% female
  • 26.0% Black non-Hispanic; 21.2% Hispanic; 51.9% non-Black/non-Hispanic

PROCEDURE
• In-person or telephone-administered questionnaire
• Audio CASI for substance use items
• 14 annual “rounds” or waves
• Final sample ranged from age 11 to age 33
• Analyses included data from age 12-30

MEASURES (past 30-day substance use)
• Alcohol use
  • On how many days did you have one or more drinks of an alcoholic beverage?
• On how many days did you have five or more drinks on the same occasion?
• Smoking
  • On how many days did you smoke a cigarette?
• Marijuana use
  • On how many days have you used marijuana?
  • Latent growth modeling using a two-piece linear spline model with an unknown transition point (i.e., knot) (Harring, Cudeck & Du Toit, 2006)
  \[ y_i = \Lambda(\gamma)\eta_i + \epsilon_i \] where \( \gamma \) is the knot
  • Compared to other non-linear models
    • Quadratic trend
    • Spline models with user-specified knots (ages 19, 20, 21, and 22)
  • The model with the unknown transition point exhibited better fit compared to all other models with the exception of smoking

Results

Course of substance use from age 12 to age 30

- Sex and race/ethnic group differences
  • Girls reached peak prevalence significantly earlier for heavy drinking and smoking but later for marijuana use
  • Black and Hispanic youth significantly differed from non-Black/non-Hispanic youth only on smoking
  • No significant sex or race/ethnic differences for frequency of alcohol use

<table>
<thead>
<tr>
<th>IDENTIFIED KNOT (age)</th>
<th>Freq alcohol use</th>
<th>Heavy Drinking*</th>
<th>Freq marijuana use*</th>
<th>Freq smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full sample</td>
<td>21.25</td>
<td>20.49</td>
<td>19.18</td>
<td>18.80</td>
</tr>
<tr>
<td>Girls</td>
<td>21.23</td>
<td>19.82*</td>
<td>19.57*</td>
<td>18.60***</td>
</tr>
<tr>
<td>Boys</td>
<td>21.28</td>
<td>20.60</td>
<td>18.90</td>
<td>19.49</td>
</tr>
<tr>
<td>nonBlk/non</td>
<td>21.07</td>
<td>20.45</td>
<td>19.17</td>
<td>18.61</td>
</tr>
<tr>
<td>Hisp*</td>
<td>21.21</td>
<td>20.44</td>
<td>19.67</td>
<td>20.39***</td>
</tr>
<tr>
<td>Black</td>
<td>21.54</td>
<td>20.67</td>
<td>18.69</td>
<td>19.55**</td>
</tr>
<tr>
<td>Hispanic</td>
<td>21.13</td>
<td>20.47</td>
<td>18.90</td>
<td>19.51</td>
</tr>
</tbody>
</table>

a. limited to ages 14-28 to handle sparseness
b. reference group
*** p<.001, ** p<.01, *p<.05

Model-implied trajectories relative to the sample means

- For all substances, we observed a steep linear increase throughout adolescence
- Observed differential decline following peak use
  • Heavy drinking and marijuana use showed linear decline
  • Frequency of alcohol consumption and smoking plateaued
- Findings have implications for prevention work
  • Pinpoint the timing of normative maturing out in the general population, and specifically for subpopulations
  • Detect important life transitions that may contribute to these specific turning points
  • Identify and target malleable risk factors that precede or co-occur with the turning points

Future directions

• Identify distinct underlying populations with different turning points – Piecewise Latent Growth Mixture Models (Kohli, Harring, & Hancock, 2013)

Conclusions

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