Is Screentime Important?

Efficacy of a Computer-Facilitated Brief Intervention for Reducing Adolescent Substance Use is Predicted by Viewing Time

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INSTITUTIONS:
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Growing interest in computer-facilitated substance use screening and brief interventions, particularly for adolescents who are digital natives.
Multi-site study* (USA, CZR) found primary care computer-facilitated Screening and clinician Brief Advice (cSBA) associated with lower rates of alcohol (USA) and cannabis (CZR) use during 12-months follow-up compared to usual care, based on intent-to-treat analysis

cSBA Description

Computer-facilitated system included:
(demo available on www.ceasar-boston.org/isbirt)

- Computer self-administered CRAFFT screener; immediate feedback about score and risk-level
- 10 interactive pages presenting science and true-life stories about harmful effects of substance use and related riding/driving risk
- Provider Report given to provider with screen results and ‘talking points’ to prompt 2-3 minute discussion with teen
Current Research Question

Among *participants receiving intervention*, is amount of time spent viewing the computer-delivered educational content predictive of substance use outcomes at 3 and 12 months?
1. Characterize the amount of time adolescents spent viewing the cSBA content, and identify covariates (e.g., previous substance use, age, gender, race/ethnicity, parent education level)

- **Hypothesis:** Viewing time will be significantly associated with prior substance use experience
  - Teens with prior use will have shorter viewing times than non-users (i.e., less interested in viewing threatening health-risk messages)
2. Examine relationship between viewing time and report of substance use at 3- and 12-month follow-ups

- **Hypothesis:** Longer viewing times will predict lower substance use rates at follow-up, after adjustment for receipt of clinician advice, and other potential confounders (age, etc.)

- Effect will be moderated by prior substance use experience at baseline.
Consecutively recruited 12- to 18-year-olds presenting for routine primary care at pediatrician offices, hospital clinics, managed care organization (9 sites in New England USA, 10 in Prague CZR)

Study assessments completed at baseline, 3- and 12-months follow-up
Providers instructed to “Do what you usually do.”

Recruit/assess Treatment as Usual

1-hr Provider training; Computer system initiated at all sites

Recruit/assess cSBA

Study Design (2005-2009) Before/After Comparative Effectiveness Trial
Measures for current study

- cSBA computer program automatically recorded time (seconds) spent on each page
  - Excluded 4 USA sites and 1 CZR site due to computer time-recording problem
- Values of >300 seconds (5 min) on a single page excluded as out-of-range
- **Total viewing time**: sum total of time spent on all pages
Measures for current study, cont’d

- Substance use measures at each timepoint:
  - Timeline Follow-Back (TLFB) calendar interview assessing use-days of alcohol, cannabis, other drugs during past 90 days
  - Any past-12-months use (yes/no)

- Other measures:
  - Demographics (age, gender, race/ethnicity, parent education level)
  - Receipt of provider advice about substance use during visit (post-visit questionnaire)
Data Analysis

- GEE logistic regression modeling (SUDAAN software) to test effect of viewing time on substance use at:
  - 3 months (past-90-days use)
  - 12 months (past-12-months use)
- Stratified models by past-12-month substance use at baseline
- Controlled for demographics, peer/family substance use, whether received any brief advice to avoid substance use
Recruitment & Retention

USA

1153 Invited
1028 (89%) Baseline
717* Analysis subset
540 (75%) 3-Mo. Post
608 (85%) 12-Mo. Post

CZR

292 Invited
292 (100%) Baseline
269* Analysis subset
249 (93%) 3-Mo. Post
244 (91%) 12-Mo. Post

* Excluded 4 USA sites and 1 CZR site due to time-recording issues
## Baseline Sample Characteristics

<table>
<thead>
<tr>
<th></th>
<th>USA (N=717)</th>
<th>CZR (n=269)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls</td>
<td>46.6%</td>
<td>47.6%</td>
</tr>
<tr>
<td>Age (mean ± SD years)</td>
<td>15.5 ± 2.0</td>
<td>15.0 ± 1.6</td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td>56.9%</td>
<td>100%</td>
</tr>
<tr>
<td>Parent college graduate</td>
<td>54.0%</td>
<td>40.7%</td>
</tr>
<tr>
<td>Any past-12-month use</td>
<td>26.4%</td>
<td>56.5%</td>
</tr>
<tr>
<td>Any past-3-month use</td>
<td>17.8%</td>
<td>44.6%</td>
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# Viewing Time Descriptive Statistics

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<td></td>
<td></td>
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<td>Low (seconds)</td>
<td>5 (2 – 12)</td>
<td>10 (6 - 15)</td>
</tr>
<tr>
<td>High (seconds)</td>
<td>19 (6 – 28)</td>
<td>36 (26 – 47)</td>
</tr>
<tr>
<td>Total viewing time*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>7 sec – 11.2 min</td>
<td>10 sec – 9.4 min</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>2.1 min (1.0 - 3.5)</td>
<td>3.5 min (2.5 – 4.7)*</td>
</tr>
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* Significantly longer times: CZR vs. USA, younger age, non-White non-Hispanic, parents w/o college degrees, no past-12-month substance use at baseline
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* Significantly longer times: CZR vs. USA, younger age, non-White non-Hispanic, parents w/o college degrees, no past-12-month substance use at baseline
Viewing Time (seconds) by Baseline SU

**USA**

- No 12-mo use (n=529):
  - >240: 21.6%
  - 120-240: 36.1%
  - 30-119: 28.4%
  - <30: 13.9%

- 12-mo use (n=187):
  - >240: 8.2%
  - 120-240: 28.2%
  - 30-119: 49.4%
  - <30: 14.1%

**CZR**

- No 12-mo use (n=117):
  - >240: 46.8%
  - 120-240: 42.3%
  - 30-119: 8.1%
  - <30: 2.7%

- 12-mo use (n=152):
  - >240: 34.9%
  - 120-240: 45.6%
  - 30-119: 16.1%
  - <30: 3.4%

- **p-values:**
  - USA: p<.001
  - CZR: p<.126

**Legend:**
- >240
- 120-240
- 30-119
- <30

**Notes:**
- (n=187)
- (n=152)
### Viewing Time and SU at Follow-up

Adjusted Odds Ratios (AOR) for **viewing time (minutes)**, controlling for age, race/ethnicity, parent education level, receipt of provider advice

<table>
<thead>
<tr>
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<th></th>
<th>CZR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>AOR (95% CI)</td>
<td>N</td>
<td>AOR (95% CI)</td>
</tr>
<tr>
<td>Baseline SU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 months</td>
<td>397</td>
<td>1.02 (0.79-1.31)</td>
<td>105</td>
<td>0.83 (0.55-1.27)</td>
</tr>
<tr>
<td>12 months</td>
<td>455</td>
<td>0.89 (0.75-1.05)</td>
<td>109</td>
<td>0.77 (0.57-1.03)</td>
</tr>
<tr>
<td>Any</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 months</td>
<td>143</td>
<td>0.75 (0.58-0.97)</td>
<td>144</td>
<td>1.28 (0.98-1.68)</td>
</tr>
<tr>
<td>12 months</td>
<td>153</td>
<td>0.66 (0.48-0.92)</td>
<td>135</td>
<td>1.07 (0.29-3.96)</td>
</tr>
<tr>
<td>Page Number</td>
<td>USA Median (IQR)</td>
<td>CZR Median (IQR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>18 (7 – 32)</td>
<td>36 (26 – 47)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>10 (3 – 20)</td>
<td>21 (13 – 38)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>10 (4 – 18)</td>
<td>20 (12 – 28)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>9 (3 – 17)</td>
<td>17 (11 – 25)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>8 (2 – 17)</td>
<td>23 (15 – 32)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>19 (6 – 28)</td>
<td>31 (23 – 40)</td>
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</tr>
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</tr>
</tbody>
</table>
Drugs and alcohol affect your brain and can damage it for life.

Drugs and alcohol can affect memory, coordination, decision making, learning, and cause depression.

Roll over the text below and see what happens to the picture.

<table>
<thead>
<tr>
<th>Area of Brain</th>
<th>Drug Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefrontal Cortex</td>
<td>Leads to trouble making wise decisions.</td>
</tr>
<tr>
<td>Basal Ganglia</td>
<td>Impairs coordination, slows reflexes.</td>
</tr>
<tr>
<td>Hippocampus</td>
<td>Causes short-term memory loss.</td>
</tr>
<tr>
<td>Cerebellum</td>
<td>Affects balance and coordination.</td>
</tr>
<tr>
<td>Motor Cortex</td>
<td>Increases risk of stroke among young alcohol drinkers and drug users.</td>
</tr>
</tbody>
</table>

Smoking marijuana increases your risk of developing depression and schizophrenia (psychosis).

Move the mouse over the question mark (?) to find out how much using marijuana increases the risk of having mental health problems:

If you use marijuana even once your risk of developing schizophrenia increases by... ?

If you use marijuana 50 or more times your risk of developing schizophrenia increases by... ?

If you use marijuana weekly your risk of developing depression or anxiety increases by... ?

If you use marijuana daily your risk of developing depression or anxiety increases by... ?


Take your prescriptions exactly as your doctor says.

Never share your medicine or take someone else’s medicine.

- Prescription drugs, like pain-killers, stimulants, and tranquilizers are safe when used as directed by your doctor.
- Prescription drugs are now the second most commonly abused drug among teens, after marijuana.
- When abused:
  - Pain killers like OxyContin® (OC’s) or Vicodin® can cause addiction, brain damage, and sudden death.
  - Stimulant medications like Ritalin®, Adderall®, and Dexedrine® can cause addiction, seizures, rapid heart beat, and sudden death.
  - Tranquillizers like Klonopin® or Valium® can cause addiction, drowsiness, accidents, and death from respiratory depression.

This is a picture of Julie Z. at her junior prom. Julie was an outstanding student, skier, snowboarder, tennis player, and musician - beloved daughter, sister, and friend. Julie took oxycodone to get high and became addicted. Her family tried to help her get treatment. Before it could work Julie died from an accidental overdose of oxycodone. Her parents, brothers, and little sister will always miss her. The people who loved her will never completely get over her senseless death.

Key Findings

- Adolescents with past substance use had shorter viewing times than those without, even after controlling for age (message rejection?)

- Nevertheless, among those with use, longer viewing times predicted reduced reports of any substance use at 3- and 12-months follow-up (25%, 34% lower odds for each minute more)

- Longer viewing times found for pages on the brain, and on connection between cannabis use and mental illness
Potential Study Limitations

- Adolescents from practices in New England and Prague only; generalizability of findings needs to be determined
- Substance use data based on self-report
- Some small cell sizes due to stratified analyses
- Unable to determine why longest-viewed pages had longer viewing times, nor causality in relationship between viewing time and substance use outcomes
Among adolescents with substance use, increasing attention engagement in an interactive computer program delivering substance use health-risk information may help lower likelihood of substance use.

In future studies...

- use brain imaging to examine adolescents’ brain responses to health-risk messages and how that predicts subsequent behavior
- test use of a self-affirmation activity prior to message delivery to reduce message rejection