Reliability and validity of past-12-month frequency Items as opening questions for the updated CRAFFT adolescent substance use screening system

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- I have no commercial relationships to disclose.
- I will not be discussing any unapproved uses of pharmaceuticals or devices.
- My views do not necessarily reflect those of any of these bodies, or my academic institution.
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Background

9 OUT OF 10 PEOPLE WITH ADDICTION STARTED USING SUBSTANCES BEFORE THEY TURNED 18

Source: http://www.centeronaddiction.org
Original CRAFFT Items

**C** Have you ever ridden in a CAR driven by someone (including yourself) who was “high” or had been using alcohol or drugs?

**R** Do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in?

Score = Number of “yes” answers (range 0-6)

**A** Do you ever use alcohol/drugs while you are by yourself, ALONE?

**F** Do you ever FORGET things you did while using alcohol or drugs?

**F** Do your FAMILY or FRIENDS ever tell you that you should cut down on your drinking or drug use?

**T** Have you ever gotten into TROUBLE while you were using alcohol or drugs?
Validity of the CRAFFT Substance Abuse Screening Test Among Adolescent Clinic Patients

John R. Knight, MD; Lon Sherritt, MPH; Lydia A. Shrier, MD, MPH; Sion Kim Harris, PhD; Grace Chang, MD, MPH

Source: Knight et al., 2002
In 2009, substance use opening questions added to ...

- Increase efficiency and clarity
- Facilitate early intervention
Validity of “Yes”/”No” Opening Questions by Screening Mode, 2014

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>iPad</td>
<td>Clinician</td>
</tr>
<tr>
<td>Alcohol</td>
<td>62.1%</td>
<td>69.0%</td>
</tr>
<tr>
<td>Tobacco</td>
<td>86.0%</td>
<td>86.0%</td>
</tr>
<tr>
<td>Cannabis</td>
<td>72.0%</td>
<td>79.2%</td>
</tr>
</tbody>
</table>

Source: Harris et al., Substance Abuse, 2016;37(1):197-203
2-item alcohol screener for youth

- Have friends who drank in past year?
- Own past-year \textit{number of days} of drinking (frequency)

Item order varies by age group
The appeal of frequency screening items

- Implicitly conveys expectation that behavior occurs; therefore...
  - May be less prone to social desirability bias and more sensitive than yes/no questions*
- Captures use-frequency information that can aid clinician assessment and counseling

* Couper M et al., Soc Sci Comput Rev 2012;31(3)322-345
Little is known about how reliable and valid* responses are to substance use-frequency screening items among adolescents seeing their primary care provider (PCP)

*Compared to a criterion measure of use-frequency, not of a substance use problem or disorder
Study Objective

- Evaluate test-retest reliability and criterion validity of past-12-month number of use-days screening items when administered to adolescents presenting for a well-visit.

- **Hypothesis**: Use-frequency items will have higher sensitivity for detecting any use than yes/no items from prior study.
5 Study Sites in Massachusetts, USA:
2 pediatricians’ offices
1 urban hospital adolescent clinic
1 urban hospital pediatric clinic
1 community health center
Sample Recruitment

- Consecutively recruited age-gender-balanced convenience sample of English-speaking 12-18 year-olds presenting for annual well-visit (February 2015 to August 2016)
- Informed assent for 12- to 17-year-olds; consent for 18-year-olds
- $15 store gift card for baseline assessment
- IRB approval from all participating sites, with waiver of parental consent
Test-retest sample and method

- Invited age-gender-balanced subsample of participants to complete re-test (n=394 invited); oversampled users
- Sent secure weblink for re-test to participant’s email within 2 weeks of baseline visit, with up to 3 reminders (76.6% response)
- Re-test assessed same time period as baseline
- Additional $10 online gift card for retest
Study Flow Diagram

Participant Assent/Consent → Computerized screening before seeing PCP

Re-test through secure website (outside of clinic) <2 weeks post-visit

Confidential Interview w/ Research Assistant

RAs blinded to screening results
During the past 12 months, on how many days…

- did you drink more than a few sips of beer, wine, or any drink containing alcohol?
- did you smoke any cigarettes or use any other tobacco product?
- did you use any marijuana (pot, weed, hashish)?
- did you use any prescription medication that was not prescribed to you or more than was prescribed to you (for example, prescription pain or ADHD pills)?
- did you use anything else to get high?
These next questions ask about **YOU**.
During your **LIFETIME**:
On how many days did you drink more than a few sips of beer, wine, or any drink containing alcohol?
Confidential past-12-month Timeline Follow-Back (TLFB) interview by trained research assistant in private clinic room

- Well-established substance use assessment method using calendar to aid recall
- Adolescent disclosure of sensitive behaviors enhanced when confidentiality is assured
Data Analysis

Criterion validity:
- Any past-12-month use: Sensitivity/specificity percentages
- # of past-12-month use days: Intra-class correlation coefficients (ICC) using two-way mixed effects model (SPSS)

Test-retest reliability of screening items:
- ICCs for each set of time 1 and time 2 vars
Early Results
# Participant Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Total sample (N=844)</th>
<th>Test-retest sample (n=302)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Girls</td>
<td>50.6%</td>
<td>55.3%</td>
</tr>
<tr>
<td>Age (mean ± SD years)</td>
<td>14.8 ± 1.9</td>
<td>15.2 ± 1.8</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White non-Hispanic</td>
<td>44.8%</td>
<td>53.7%</td>
</tr>
<tr>
<td>Black non-Hispanic</td>
<td>10.4%</td>
<td>8.7%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>29.7%</td>
<td>24.0%</td>
</tr>
<tr>
<td>Asian</td>
<td>8.4%</td>
<td>6.7%</td>
</tr>
<tr>
<td>Other/Multi-race</td>
<td>6.7%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Parent highest education level ≥ college/university</td>
<td>72.4%</td>
<td>74.1%</td>
</tr>
</tbody>
</table>
# Validity – Any Past-12-Month Use

<table>
<thead>
<tr>
<th></th>
<th>TLFB Criterion % Any</th>
<th>Screening item % Any</th>
<th>Sensitivity % (95% CI)</th>
<th>Specificity % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>21.8%</td>
<td>20.3%</td>
<td>78.7 (72.2-84.0)</td>
<td>95.9 (94.1-97.2)</td>
</tr>
<tr>
<td>Tobacco</td>
<td>7.7%</td>
<td>5.0%</td>
<td>61.5 (49.3-72.4)</td>
<td>99.7 (99.0-99.9)</td>
</tr>
<tr>
<td>Cannabis</td>
<td>11.8%</td>
<td>11.1%</td>
<td>85.9 (77.5-91.4)</td>
<td>98.9 (97.9-99.5)</td>
</tr>
<tr>
<td>Any Substance</td>
<td>23.9%</td>
<td>23.6%</td>
<td>81.6 (75.6-86.4)</td>
<td>94.5 (92.5-96.1)</td>
</tr>
</tbody>
</table>

- Medications and other drug use not analyzed due to low numbers
## Validity – # of past-12-month use days

<table>
<thead>
<tr>
<th></th>
<th>TLFB Criterion Mean ± SE</th>
<th>Screening item Mean ± SE</th>
<th>ICC (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>1.34 ± 0.21</td>
<td>1.40 ± 0.21</td>
<td>.55 (.51-.60)</td>
</tr>
<tr>
<td>Tobacco</td>
<td>2.33 ± 0.87</td>
<td>2.02 ± 0.79</td>
<td>.81 (.79-.83)</td>
</tr>
<tr>
<td>Cannabis</td>
<td>3.33 ± 0.85</td>
<td>2.71 ± 0.77</td>
<td>.80 (.77-.82)</td>
</tr>
</tbody>
</table>
So what about our hypothesis?
Yes/No vs. Frequency opening questions: Comparison of Sensitivity

<table>
<thead>
<tr>
<th></th>
<th>Computer self-administered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes/No* (2014 study)</td>
</tr>
<tr>
<td>Alcohol</td>
<td>62.1</td>
</tr>
<tr>
<td>Tobacco</td>
<td>86.0</td>
</tr>
<tr>
<td>Cannabis</td>
<td>72.0</td>
</tr>
</tbody>
</table>

*Harris et al., Substance Abuse, 2016;37(1):197-203
For alcohol and cannabis, past-12-month frequency items administered on computer showed better sensitivity for identifying users (compared to yes/no items in prior study)

Specificity was high for all frequency items (few false positives)
Validity of # of days of use low for alcohol (found higher mean days on screener compared to TLFB)

Test-retest reliability for frequency items high (ICC range .84-.96)
STILL COLLECTING AND CLEANING DATA

Rates of tobacco and other drug use too low in this study so unable to evaluate

Findings may not be generalizable to other adolescent populations

Criterion measure based on self-report
Similar to adult studies, (Smith PC et al., 2009, 2010), frequency items appear to be reliable and valid substance use screening items for adolescents seen in primary care.
Are frequency items enough?

Validity of Brief Screening Instrument for Adolescent

NIH Public Access

Author Manuscript

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Published in final edited form as:


An Electronic Screen for Triaging Adolescent Substance Use by Risk Levels


Adolescent Substance Abuse Program, Boston Children’s Hospital, Boston, Massachusetts (Levy, Ziemnik, Van Hook); Division of Developmental Medicine, Boston Children’s Hospital, Boston, Massachusetts (Levy, Sherritt, Ziemnik, Van Hook); Department of Pediatrics, Harvard
CRAFFT 2.0 Screening System

(Consumption)

Past-12-mo Frequency

Use

(Safety risk)

CAR question only

No use

(Problem assessment)

Six CRAFFT items
The CRAFFT Questionnaire (version 2.0)
To be completed by patient

Please answer all questions honestly; your answers will be kept confidential.

During the PAST 12 MONTHS, on how many days did you:

1. Drink more than a few sips of beer, wine, or any drink containing alcohol? Put “0” if none.
   
   # of days

2. Use any marijuana (pot, weed, hash, or in foods) or “synthetic marijuana” (like “K2” or “Spice”)? Put “0” if none.
   
   # of days

3. Use anything else to get high (like other illegal drugs, prescription or over-the-counter medications, and things that you sniff or “huff”)? Put “0” if none.
   
   # of days

READ THESE INSTRUCTIONS BEFORE CONTINUING:
- If you put “0” in ALL of the boxes above, ANSWER QUESTION 4, THEN STOP.
- If you put “1” or higher in ANY of the boxes above, ANSWER QUESTIONS 4-9.

4. Have you ever ridden in a CAR driven by someone (including yourself) who was “high” or had been using alcohol or drugs?
   
   No ☐ Yes ☐

5. Do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in?
   
   No ☐ Yes ☐

6. Do you ever use alcohol or drugs while you are by yourself, or ALONE?
   
   No ☐ Yes ☐

7. Do you ever FORGET things you did while using alcohol or drugs?
   
   No ☐ Yes ☐

8. Do your FAMILY or FRIENDS ever tell you that you should cut down on your drinking or drug use?
   
   No ☐ Yes ☐

9. Have you ever gotten into TROUBLE while you were using alcohol or drugs?
   
   No ☐ Yes ☐

Available at: http://www.childrenshospital.org/ceasar/crafft/screening-questionnaire

CRAFFT 2.0