The Columbia Lighthouse Project/Center for Suicide Risk Assessment

The Columbia Suicide Severity Rating Scale (C-SSRS)

Supporting Evidence

Last Revised
5-1-2021
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### The Columbia Suicide Severity Rating Scale (C-SSRS): Psychometric Evidence

#### Table 1: Studies Supporting Specific Psychometric Properties of the Full Version

<table>
<thead>
<tr>
<th>Psychometric Property</th>
<th>Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical Utility</strong></td>
<td>Brent et al., 2009^; Posner et al., 2011^; Mundt et al., 2013*; Arias et al. 2013*; Greist et al. 2014*; Jang et al., 2014*; Brown et al., 2015*; Gipson et al., 2015^; Horwitz et al., 2015^; Arias et al., 2016*; Madan et al. 2016*; Conway et al. 2016^; Hill et al 2017^; Lindh et al. 2018; Matarazzo et al. 2018^; Park et al. 2019^; King et al. 2019^; Bjureberg et al 2021^</td>
</tr>
<tr>
<td><strong>Predictive and/or Incremental Validity</strong></td>
<td>Posner et al., 2011^; Ionescu et al., 2016^; Lindh et al, 2019^</td>
</tr>
<tr>
<td><strong>Sensitivity to Change</strong></td>
<td>Posner et al., 2011^; Mundt et al., 2013*; Viguera et al. 2015*; Madan et al. 2016*; Lindh et al, 2019^; Bjureberg et al 2021^</td>
</tr>
<tr>
<td><strong>Sensitivity and Specificity</strong></td>
<td>Posner et al., 2011^; Mundt et al., 2013*; Viguera et al. 2015*; Madan et al. 2016*; Lindh et al, 2019^; Bjureberg et al 2021^</td>
</tr>
<tr>
<td><strong>Positive and Negative Predictive Value (PPV &amp; NPV)</strong></td>
<td>Munt et al 2013^; Viguera et al 2015^; Park et al 2019^; Bjureberg et al 2021^</td>
</tr>
<tr>
<td><strong>Reliability (internal consistency)</strong></td>
<td>Posner et al., 2011^; Kilincaslan et al. 2018^; Pai et al. 2015^; Madan et al. 2016*; Franks et al 2020^</td>
</tr>
<tr>
<td><strong>Reliability (inter-rater; multi-method agreement; test-retest)</strong></td>
<td>Kerr et al., 2013^; Brent et al., 2009^; Kilincaslan et al. 2018^; Hesdorffer et al., 2013^; Arias et al., 2013^; Brown et al., 2015^; Tabares et al 2020^</td>
</tr>
<tr>
<td><strong>Internal Structure (Factor Analysis)</strong></td>
<td>Al-Halabi et al., 2016b^; Madan et al. 2016^; Tabares et al 2020^; Franks et al 2020^</td>
</tr>
<tr>
<td><strong>Convergent Validity &amp; Accuracy</strong></td>
<td>Posner et al., 2011^; Kerr et al., 2013^; Kilincaslan et al. 2018^; Pai et al. 2015^; Youngstrom et al. 2015^; Brown et al., 2015^; Madan et al. 2016^</td>
</tr>
<tr>
<td><strong>Divergent &amp; Discriminant Validity</strong></td>
<td>Posner et al., 2011^; Kerr et al., 2013^; Kilincaslan et al. 2018^</td>
</tr>
<tr>
<td><strong>Cross-Cultural Validation</strong></td>
<td>Danish (Conway et al. 2016^); Turkish (Kilincaslan et al. 2018^); Korean (Pai et al. 2015^); Spanish (Al-Halabi et al., 2016ab^)</td>
</tr>
</tbody>
</table>
* studies include adult samples; ^ studies include pediatric samples

### Table 2: Psychometric Properties of the C-SSRS Ideation and Behavior with Coefficients

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Criterion</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bjureberg et al 2021</strong>&lt;br&gt;Idiation severity (1-5) past month</td>
<td>Death by suicide</td>
<td>Within 7 days: OR = 1.6 (1.2–2.1)&lt;br&gt;Within one month: adjusted OR 1.5, 95% CI 1.2–1.8&lt;br&gt;Within one year: adjusted OR 1.3, 95% CI 1.1–1.4</td>
</tr>
<tr>
<td><strong>Greist et al. 2014</strong>&lt;br&gt;None Reported</td>
<td>Actual, interrupted or aborted attempts</td>
<td>All patients: 0.8% incidence rate, N=4975&lt;br&gt;Psychiatric patients: 1.1% incidence rate, N=3184</td>
</tr>
<tr>
<td><strong>Greist et al. 2014</strong>&lt;br&gt;Wish to Be Dead</td>
<td>Actual, interrupted or aborted attempts</td>
<td>OR= 6.21, 95% CI = 4.18 – 9.23, p &lt;0.001&lt;br&gt;OR= 4.99, 95% CI = 3.29 – 7.56, p &lt;0.001</td>
</tr>
<tr>
<td><strong>Greist et al. 2014</strong>&lt;br&gt;Non-Specific Active Thoughts</td>
<td>Actual, interrupted or aborted attempts</td>
<td>OR= 6.69, 95% CI = 4.16 – 10.76, p &lt;0.001&lt;br&gt;OR= 5.53, 95% CI = 3.38–9.04, p &lt;0.001</td>
</tr>
<tr>
<td><strong>Greist et al. 2014</strong>&lt;br&gt;Active with any methods (not plan) w/o intent to act</td>
<td>Actual, interrupted or aborted attempts</td>
<td>OR= 11.16, 95% CI = 7.43–16.76, p &lt;0.001&lt;br&gt;OR= 8.36, 95% CI = 5.44–12.84, p &lt;0.001</td>
</tr>
<tr>
<td><strong>Greist et al. 2014</strong>&lt;br&gt;Active with Some Intent to Act, without specific plan</td>
<td>Actual, interrupted or aborted attempts</td>
<td>OR= 19.27, 95% CI = 12.97 – 28.63, p &lt;0.001&lt;br&gt;OR= 15.24, 95% CI = 10.07–23.09, p &lt;0.001</td>
</tr>
<tr>
<td><strong>Greist et al. 2014</strong>&lt;br&gt;Active with specific plan and intent</td>
<td>Actual, interrupted or aborted attempts</td>
<td>OR= 25.53, 95% CI = 16.94 – 38.47, p &lt;0.001&lt;br&gt;OR= 18.70, 95% CI = 12.16 – 28.76, p &lt;0.001</td>
</tr>
<tr>
<td><strong>Posner et al. 2011</strong>&lt;br&gt;(TASA study N=124, ages 12-18)</td>
<td>Baseline worst-point</td>
<td>OR=1.45, 95% CI=1.07-1.98, p=0.02</td>
</tr>
<tr>
<td></td>
<td>Actual, interrupted and aborted attempts</td>
<td>OR=1.34, 95% CI=1.05-1.70, p=0.02</td>
</tr>
<tr>
<td></td>
<td>Lifetime severity</td>
<td>OR=1.43, 95% CI=0.99-2.05, p=0.05</td>
</tr>
<tr>
<td>Study</td>
<td>Severity</td>
<td>Outcome</td>
</tr>
<tr>
<td>-------</td>
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</tr>
<tr>
<td><strong>Horwitz et al. 2015</strong>&lt;br&gt;(N=473, ages 15-24)</td>
<td>Severity 4-5 (any intent to act)</td>
<td>Attempts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Actual, interrupted and aborted attempts</td>
</tr>
<tr>
<td><strong>Arias et al. 2016</strong>&lt;br&gt;(N=874, mean age 37)</td>
<td>Ideation severity 1 to 5</td>
<td>Attempt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Actual attempt or suicide 6 weeks post-ED visit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Actual, interrupted, aborted attempts, suicide or preparatory behavior</td>
</tr>
<tr>
<td><strong>Madan et al. 2016:</strong>&lt;br&gt;(N=1,055 adult psych in-patients)</td>
<td>Most severe ideation within 72 hours of hospitalization</td>
<td>Any suicide behavior within 6 months post hospitalization</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Psychiatric re-hospitalization within 6 months</td>
</tr>
<tr>
<td><strong>Conway et al. 2016:</strong>&lt;br&gt;(N=85 adolescents, age &lt; 18, mean age=16.2)</td>
<td>Severity of ideation (1-5)</td>
<td>Any type of suicidal behavior at follow-up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ideation with intent to act (4 or 5)</td>
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<tr>
<td></td>
<td></td>
<td>Ideation intensity total score</td>
</tr>
<tr>
<td><strong>Lindh et al. 2018</strong>&lt;br&gt;(N=804 Adults, age 18-95 years, median age=33)</td>
<td>Most Severe Ideation</td>
<td>Actual Attempt</td>
</tr>
<tr>
<td><strong>Matarazzo et al 2018</strong>&lt;br&gt;(n=237, mean age 46.1)</td>
<td>Ideation severity 1 to 5</td>
<td>Actual attempt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Preparatory behavior</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Any behavior</td>
</tr>
<tr>
<td><strong>Park et al 2019</strong></td>
<td>Ideation severity 1 to 5</td>
<td>Planned actual attempt</td>
</tr>
<tr>
<td>Study</td>
<td>Population Details</td>
<td>Ideation severity 5 with specific plan and any intent</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>King et al 2019</td>
<td>(N=2,104, ages 12-17)</td>
<td>Lifetime ideation severity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predictive Validity – SI Intensity</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Criterion</th>
<th>Coefficients</th>
</tr>
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<tbody>
<tr>
<td><strong>Conway et al. 2016:</strong> (N=85 adolescents, age &lt;18, mean age=16.2)</td>
<td>Ideation intensity total score</td>
<td>Any type of suicidal behavior at follow-up</td>
</tr>
<tr>
<td><strong>Lindh et al. 2018</strong> (N=804 adults, ages 18-95 years, median age=33)</td>
<td>Total Intensity Score</td>
<td>Actual Attempt</td>
</tr>
<tr>
<td></td>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Duration</td>
<td></td>
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<tr>
<td></td>
<td>Controllability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deterrents</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reasons</td>
<td></td>
</tr>
<tr>
<td><strong>Gipson et al. 2014</strong> (N=178, ages 13-17)</td>
<td>Total Intensity Score</td>
<td>Return Psychiatric Emergency Visit</td>
</tr>
<tr>
<td></td>
<td>Duration</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Actual Attempt</td>
</tr>
</tbody>
</table>

(N=1359, age≥10)

Or OR=5.30 CI 1.17-24.07, p < .05
## Predictive Validity - Suicidal Behavior

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Criterion</th>
<th>Coefficients</th>
</tr>
</thead>
</table>
| **Bjureberg et al 2021** | Suicidal behavior question | Death by suicide | **Within 7 days:** adjusted OR 6.9, 95% CI 2.1–22.7  
**Within one month:** adjusted OR 5.1, 95% CI 2.3–11.2  
**Within one year:** adjusted OR 2.8, 95% CI 1.7–4.5 |
| **Horwitz et al. 2015:**  
(N=473, ages 15-24) | Attempt | Attempt | OR=4.80, 95% CI = 2.23-10.32, p<0.001 |
| NSSIB item | Attempt | OR=3.12, 95% CI = 1.36-7.19, p<0.01 |
| **Gipson et al. 2014**  
(N=178, ages 13-17) | NSSIB item | Attempt | OR = 1.52; 95% CI, 1.08-2.12, p<0.05 |
| **Conway et al. 2016**  
(N=85, age < 18, mean age=16.2) | Attempts | Re-attempt [short-term] | OR= 11.50, 95% CI= 1.66-79.65, p<0.05 |
| **Greist et al. 2014** | Attempt | Actual, interrupted or aborted attempts | OR=4.57, 95% CI = 3.6-5.7, p<0.001 |
| Interrupted Attempt | Actual, interrupted or aborted attempts | OR=5.55, 95% CI = 4.4-7.0, p<0.001 |
| Aborted Attempt | Actual, interrupted or aborted attempts | OR=5.09, 95% CI = 4.1-6.4, p<0.001 |
| Preparatory behavior | Actual, interrupted or aborted attempts | OR=5.69, 95% CI = 4.3-7.5, p<0.001 |

## Incremental Validity and Accuracy

**Brent et al., (2009):** Treatment resistant, depressed adolescent suicide attempters  
(N=334, ages 12-18)  
- Higher rates of suicidal (20.8% vs. 8.8%, chi squared= 9.18, df=1, p<0.002) and non-suicidal self-injury (17.6% vs. 2.2%, chi squared= 23.47, df=1, p<0.001) detected with systematic monitoring
Horwitz et al. (2015): Young adult psychiatric emergency patients (N=473, ages 15-24)

- Suicidal ideation added incremental validity to the prediction of future suicide attempts beyond the past suicide attempt, $\chi^2 (1) = 7.54, p = .006$

Brown et al. (2015): psychiatric ER patients (N=250)

- 18% (n=23) of patients with a suicide attempt in the past week misclassified or missed by clinical assessment.
- Agreement with clinical assessment for suicide attempts ($K=0.76$, $p<.001$)
- Agreement with clinical assessment of non-suicidal self-injurious behavior ($K=0.72$, $p<.001$)

Arias et al. (2013): 497 ER adult patients with suicidal thoughts or attempt(s)

- 41% increase in the detection of suicide attempts compared to chart reviews (59% vs. 18%, difference of 41%, 95% CI= 28-55, $p<0.001$)

<table>
<thead>
<tr>
<th>Study</th>
<th>Ideation Type</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brent et al. (2009) (N=334, ages 12-18)</td>
<td><strong>suicidal ideation ranging from 0 to 5 (from no ideation to suicidal ideation with intent and a clear plan)</strong> monitored weekly</td>
<td>ICC = .09, $p&lt; 0.001$</td>
</tr>
<tr>
<td>Kilincaslan et al. (2018) (N=213, ages 12-18)</td>
<td><strong>Inter-rater reliability for the most severe ideation scores in the last month and lifetime were good</strong></td>
<td>Lifetime κ = 0.92, Recent κ = 0.88</td>
</tr>
<tr>
<td>Youngstrom et al. (2015)</td>
<td>Accuracy calibrated against “missing gold standard” latent class-derived ideation and behavior categories</td>
<td>κ &gt; 0.7</td>
</tr>
<tr>
<td>Hesdorffer et al. (2013)</td>
<td>Agreement between the MINI, C-SSRS and eC-SSRS for lifetime suicidal ideation</td>
<td>κ = 0.80, 95% CI = 0.72-0.89</td>
</tr>
<tr>
<td>Gwaltney et al. (2017) (N=86, ages &gt;18)</td>
<td>Equivalence analyses/multi-method agreement between IVR (interactive voice response) and tablet text-based eC-SSRS for most severe lifetime ideation</td>
<td>Correlation: 0.87, $p&lt;0.001$, ICC: κ = 0.89, $p&lt;0.001$</td>
</tr>
<tr>
<td></td>
<td>Equivalence analyses between IVR (interactive voice response) and tablet text-based eC-SSRS for most severe ideation in past 6 months</td>
<td>Correlation: 0.69, $p&lt;0.001$, ICC: κ = 0.79, $p&lt;0.001$</td>
</tr>
</tbody>
</table>
## Reliability - Suicidal Behavior

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Description</th>
<th>Agreement Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gwaltney et al. (2017)</strong></td>
<td>N=86, ages &gt;18</td>
<td>Equivalence analyses/multi-method agreement between IVR (interactive voice response) and tablet text-based eC-SSRS for lifetime Actual attempts</td>
<td>κ = 0.81, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of lifetime actual attempts</td>
<td>κ = 0.81, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Actual attempts (recent-last 2 yrs)</td>
<td>κ = 0.73, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interrupted attempts (lifetime)</td>
<td>κ = 0.78, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interrupted attempts (recent-last 2 yrs)</td>
<td>κ = 0.762, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aborted attempts (lifetime)</td>
<td>κ = 0.54, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aborted attempts (recent-last 2 yrs)</td>
<td>κ = 0.74, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Preparatory behaviors (lifetime)</td>
<td>κ = 0.77, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Preparatory behaviors (recent-last 2 yrs)</td>
<td>κ = 0.89, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-suicidal, self-injurious behavior</td>
<td>κ = 0.73, p&lt;0.001</td>
</tr>
<tr>
<td><strong>Brent et al. (2009)</strong></td>
<td>N=334, ages 12-18</td>
<td>Inter-rater reliability for a rating of suicidal behavior, ranging from 0 to 5 (no behavior to multiple attempts during the assessment period) using the Columbia Classification Algorithm of Suicide Assessment</td>
<td>100% agreement</td>
</tr>
<tr>
<td><strong>Kerr et al. (2014a,b)</strong></td>
<td>N=155, ages 13-17</td>
<td>Inter-rater agreement for distinction among actual, aborted, interrupted attempts, preparatory acts and any other act</td>
<td>κ = 0.88; κ = .91</td>
</tr>
<tr>
<td><strong>Brown et al. (2015)</strong></td>
<td></td>
<td>Agreement with clinical assessment for attempts</td>
<td>κ = 0.76, P &lt; .001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agreement with clinical assessment for non-suicidal self-injurious behavior</td>
<td>κ = 0.72, P &lt; .001</td>
</tr>
<tr>
<td><strong>Youngstrom et al. (2015)</strong></td>
<td></td>
<td>Accuracy of attempt: calibrated against latent class-derived categories</td>
<td>κ &gt; 0.8</td>
</tr>
</tbody>
</table>
References for Psychometric Evidence (Tables 1&2)


**Scoring and Data Analysis Guides**


**Linguistic and Psychometric Validation of the C-SSRS Translations**

Columbia Suicide Severity Rating Scale Versions
(Adapted versions)

C-SSRS Clinical Practice Screener

- Omołowa, P., & Tribble, K. L. The Impact of C-SSRS (Columbia-Suicidal Severity Rating Scale) Usage on Quality of Care in John George Psychiatric Hospital (San Leandro, CA): a Medical Care Evaluation Study.

C-SSRS Self-Report
("paper" non-adaptive version, i.e. not eCSSRS)


### The Columbia Suicide Severity Rating Scale (C-SSRS): Diagnostic and Treatment-Monitoring Effectiveness

#### Table 3:

<table>
<thead>
<tr>
<th>C-SSRS as an Effective Measure for Diagnosis &amp; Treatment</th>
<th>Veterans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legarreta et al., 2015</td>
<td>• The association of specific PTSD symptoms with suicidal ideation and behavior suggested individual PTSD symptoms as treatment target for reducing suicidal outcomes.</td>
</tr>
</tbody>
</table>
| Veterans | Harvey et al., 2018 | • A lifetime history of suicidal ideation and behavior was higher among the Vets with Bipolar Disorder (82.3%, N=5414) than Schizophrenia (69.9%, N=3942)  
• The highest risk was found for patients with multiple psychiatric comorbidities (OR = 2.61 for ideation; OR = 3.82 for behavior). Clinical factors (e.g., psychiatric comorbidity) contributed more of the variance in the predictive model than demographic factors. |
| Medication Treatment | Ionescu et al. (2016) | • Ketamine treatment effective for suicidal ideation (SI) in adults  
• SI severity improved independent of acute decrease in depression and SI intensity improved even if SI severity un-remitted  
| Prakash et al. (2012) | • Duloxetine was effective in treating suicidal ideation among children ages 7-17 with major depression  
• Distinguished children with improvement and deterioration |

### C-SSRS Training Program Evaluations

C-SSRS Representative Publications: Demographic and Clinical Populations, Settings, Treatment Efficacy and Assessment Guidelines

Pediatric Populations by Age Group

**Ages 5-11**

**Ages 6-12**
- Buchanan, J., Burke, T., Camacho, K., Yershova, K., Lazzaretto, D., Posner, K. (2013) Preschool Bullying and Victimization as Predictors of Suicidal Ideation in School Age: 6-year Follow-Up of the Preschool Attention Deficit/Hyperactivity Disorder Treatment Study (PATS). 1st Annual Meeting of the International Academy for Suicide Research, Montreal, Canada.

**Ages 6-17**

**Ages 6-18**

**Ages 7-13**

**Ages 7-17**


**Ages 7-18 (for the pediatric sub-sample; also includes studies with adults)**


**Ages 8-12**


**Ages 11-17**


**Ages 12-17**


**Ages 12-17.5**


**Ages 12-18**


**Ages 13-17**


**Ages 13-19**


**Ages 14-19**


Studies with Adolescents and Young Adults

**Ages 13-25**

**Ages 14-39**

**Ages 15-20**

**Ages 15-24**

**Ages 20-22**

Demographic Groups

**Asian Americans**

School Protocols


Medical Specialties

**Neurology**

Oncology

Psoriasis

Psychiatric Conditions

Alzheimer’s

ADHD
Alcohol

Autism

Bipolar Depression

Complicated Grief

Generalized Anxiety Disorder (GAD)

Perinatal/Postpartum Depression

Psychosis/Schizophrenia

PTSD

Sleep

Healthcare Systems

Outpatient Settings
Outpatient Psychiatry

Integrated Primary Care

Veterans

Forensic Settings
• SEE ALSO “JUVENILE JUSTICE”
Juvenile Justice


Emergency Departments


**In-Patient Psychiatric Settings**


**Mobile Crisis**


**Telemedicine**


**Treatment Efficacy for Suicidal Outcomes**


Regulatory Guidelines for Treatment & Assessment of Suicidal Outcomes


Reviews of Suicide Risk Assessment Tools


Cross-Cultural Settings

**Latin America (Spanish)**


**Australia**


**China**


**Croatia**


**Ethiopia**


**France**

Germany

Hungary

Indonesia

India

Korea [add Pai]

Spain

Sri Lanka