The Columbia Suicide Severity Rating Scale (C-SSRS)
Supporting Evidence

Last Revised
7-25-2018
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### The Columbia Suicide Severity Rating Scale (C-SSRS): Psychometric Evidence

**Table 1: Studies Supporting Specific Psychometric Properties**

<table>
<thead>
<tr>
<th>Psychometric Property</th>
<th>Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Utility</td>
<td><strong>Predictive and/or Incremental Validity</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Sensitivity to Change</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Sensitivity and Specificity</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Positive and Negative Predictive Value (PPV &amp; NPV)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Reliability (internal consistency)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Reliability (inter-rater; multi-method agreement)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Internal Structure (Factor Analysis)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Convergent Validity &amp; Accuracy</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Divergent &amp; Discriminant Validity</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Cross-Cultural Validation</strong></td>
</tr>
</tbody>
</table>

* studies include adult samples; ^ studies include pediatric samples
<table>
<thead>
<tr>
<th>Predictor</th>
<th>Criterion</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greist et al. 2014</td>
<td>None Reported</td>
<td>All patients: 0.8% incidence rate, N=4975</td>
</tr>
<tr>
<td></td>
<td>Actual, interrupted or aborted attempts</td>
<td>Psychiatric patients: 1.1% incidence rate, N=3184</td>
</tr>
<tr>
<td>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</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OR= 4.99, 95% CI = 3.29 – 7.56, p &lt;0.001</td>
</tr>
<tr>
<td>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</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OR= 5.53, 95% CI = 3.38-9.04, p &lt;0.001</td>
</tr>
<tr>
<td>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</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OR= 8.36, 95% CI = 5.44-12.84, p &lt;0.001</td>
</tr>
<tr>
<td>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</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OR= 15.24, 95% CI = 10.07-23.09, p &lt;0.001</td>
</tr>
<tr>
<td>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</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OR= 18.70, 95% CI = 12.16 – 28.76, p &lt;0.001</td>
</tr>
<tr>
<td>Posner et al. 2011</td>
<td>Baseline worst-point</td>
<td>OR=1.45, 95% CI=1.07-1.98, p=0.02</td>
</tr>
<tr>
<td>(TASA study N=124, ages 12-18)</td>
<td>Attemps</td>
<td></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>Lifetime severity</td>
<td>Attemps</td>
<td>OR=1.43, 95% CI=0.99-2.05, p=0.05</td>
</tr>
<tr>
<td>Severity 4-5 (any intent to act)</td>
<td>Attemps</td>
<td>OR=3.26, 95% CI=1.02-10.45, p=0.047</td>
</tr>
<tr>
<td></td>
<td>Actual, interrupted and aborted attempts</td>
<td>OR= 3.26, 95% CI=1.07-7.12, p=0.036</td>
</tr>
<tr>
<td>Horwitz et al. 2015</td>
<td>Ideation severity 1 to 5</td>
<td>OR= 1.51, 95% CI= 1.24-1.84, p&lt;0.001</td>
</tr>
<tr>
<td>(N=473, ages 15-24)</td>
<td>Attempt</td>
<td></td>
</tr>
<tr>
<td>Arias et al. 2016</td>
<td>Current ideation severity 4 or 5 (with intent to die)</td>
<td>OR=1.70 95% CI 1.18-2.44, p =.004</td>
</tr>
<tr>
<td></td>
<td>Actual attempt or suicide 6 weeks post-ED visit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Actual, interrupted, aborted attempts, suicide or preparatory behavior</td>
<td>OR =1.52 95%CI 1.23-1.86 p &lt;. 001</td>
</tr>
<tr>
<td><strong>Madan et al. 2016:</strong> (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>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Psychiatric re-hospitalization within 6 months</td>
</tr>
<tr>
<td><strong>Conway et al. 2016:</strong> (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>Ideation with intent to act (4 or 5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ideation intensity total score</td>
<td></td>
</tr>
</tbody>
</table>

### Predictive Validity - Suicidal Behavior

<table>
<thead>
<tr>
<th><strong>Horwitz et al. 2015:</strong> (N=473, ages 15-24)</th>
<th>Attempt</th>
<th>Attempt</th>
<th>OR=4.80, 95% CI = 2.23-10.32, p&lt;0.001</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NSSIB item</td>
<td>Attempt</td>
<td>OR=3.12, 95% CI = 1.36-7.19, p&lt;0.01</td>
</tr>
<tr>
<td><strong>Gipson et al. 2014</strong> (N=178, ages 13-17)</td>
<td>NSSIB item</td>
<td>Return ER visit</td>
<td>OR = 1.52; 95% CI, 1.08-2.12, p&lt;.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attempt</td>
<td>$X^2 = 4.131, df = 1, p = 0.04$</td>
</tr>
<tr>
<td><strong>Conway et al. 2016</strong>  (N=85, age &lt; 18, mean age=16.2)</td>
<td>Attempts</td>
<td>Re-attempt [short-term]</td>
<td>OR= 11.50, 95% CI= 1.66-79.65, p&lt;0.05</td>
</tr>
<tr>
<td><strong>Greist et al. 2014</strong></td>
<td>Attempt</td>
<td>Actual, interrupted or aborted attempts</td>
<td>OR=4.57, 95% CI = 3.6-5.7, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Interrupted Attempt</td>
<td>Actual, interrupted or aborted attempts</td>
<td>OR=5.55, 95% CI = 4.4-7.0, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Aborted Attempt</td>
<td>Actual, interrupted or aborted attempts</td>
<td>OR=5.09, 95% CI = 4.1-6.4, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Preparatory behavior</td>
<td>Actual, interrupted or aborted attempts</td>
<td>OR=5.69, 95% CI = 4.3-7.5, p&lt;0.001</td>
</tr>
</tbody>
</table>
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)

Reliability - Suicidal Ideation
(inter-rater and multi-method agreement)

<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>suicidal ideation ranging from 0 to 5 (from no ideation to suicidal ideation with intent and a clear plan) monitored weekly</td>
<td>ICC = .09, p&lt; 0.001</td>
</tr>
</tbody>
</table>
| Gunes et al. (2015) (N=211, ages 12-18) | Inter-rater reliability for the most severe ideation scores in the last month and lifetime were good | Lifetime $\kappa = 0.91$  
Recent $\kappa = 0.76$ |
<p>| Youngstrom et al. (2015) | Accuracy calibrated against “missing gold standard” latent class-derived ideation and behavior categories | $\kappa &gt; 0.7$ |</p>
<table>
<thead>
<tr>
<th>Study (Year)</th>
<th>Agreement/Analyses</th>
<th>Description</th>
<th>Correlation/ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hesdorffer et al. (2013)</td>
<td>Agreement between the MINI, C-SSRS and eC-SSRS for lifetime suicidal ideation</td>
<td>$\kappa = 0.80$, 95% CI = 0.72-0.89</td>
<td></td>
</tr>
<tr>
<td>Gwaltney et al. (2017) (N=86, ages &gt;18)</td>
<td>Equivalence analyses 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: $\kappa = 0.89$, p&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Gwaltney et al. (2017) (N=86, ages &gt;18)</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: $\kappa = 0.79$, p&lt;0.001</td>
<td></td>
</tr>
</tbody>
</table>

**Reliability - Suicidal Behavior**

<table>
<thead>
<tr>
<th>Study (Year)</th>
<th>Equivalence analyses between IVR (interactive voice response) and tablet text-based eC-SSRS</th>
<th>Correlation/ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gwaltney et al. (2017) (N=86, ages &gt;18)</td>
<td>Actual attempts (lifetime)</td>
<td>$\kappa = 0.81$, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Actual attempts (recent-last 2 yrs)</td>
<td>$\kappa = 0.73$, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Number of lifetime actual attempts</td>
<td>$\kappa = 0.81$, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Interrupted attempts (lifetime)</td>
<td>$\kappa = 0.78$, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Interrupted attempts (recent-last 2 yrs)</td>
<td>$\kappa = 0.762$, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Aborted attempts (lifetime)</td>
<td>$\kappa = 0.54$, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Aborted attempts (recent-last 2 yrs)</td>
<td>$\kappa = 0.74$, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Preparatory behaviors (lifetime)</td>
<td>$\kappa = 0.77$, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Preparatory behaviors (recent-last 2 yrs)</td>
<td>$\kappa = 0.89$, p&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Non-suicidal, self-injurious behavior</td>
<td>$\kappa = 0.73$, p&lt;0.001</td>
</tr>
<tr>
<td>Reference</td>
<td>Description</td>
<td>Measure</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Brent et al. (2009)</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>Kerr et al. (2014a,b)</td>
<td>Inter-rater agreement for distinction among actual, aborted, interrupted attempts, preparatory acts and any other act</td>
<td>$\kappa = 0.88; \kappa = 0.91$</td>
</tr>
<tr>
<td>Brown et al. (2015)</td>
<td>Agreement with clinical assessment for attempts</td>
<td>$\kappa = 0.76, P &lt; .001$</td>
</tr>
<tr>
<td></td>
<td>Agreement with clinical assessment for non-suicidal self-injurious behavior</td>
<td>$\kappa = 0.72, P &lt; .001$</td>
</tr>
<tr>
<td>Youngstrom et al. (2015)</td>
<td>Accuracy of attempt: calibrated against latent class-derived categories</td>
<td>$\kappa &gt; 0.8$</td>
</tr>
<tr>
<td>Hesdorffer et al. (2013)</td>
<td>Agreement between the MINI, C-SSRS and eC-SSRS for lifetime suicidal behavior</td>
<td>$\kappa = 0.67, 95% \text{ CI} = 0.53-0.80$</td>
</tr>
</tbody>
</table>
The Columbia Suicide Severity Rating Scale (C-SSRS): Impact in Public Health and Diagnostic and Treatment-Monitoring Effectiveness

Table 3: C-SSRS as Intervention and Measure of Diagnosis and Treatment

<table>
<thead>
<tr>
<th>C-SSRS as an Effective Measure for Diagnosis &amp; Treatment</th>
<th>Veterans</th>
<th>Veterans</th>
<th>Medication Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Legarreta et al., 2015</td>
<td>Harvey et al., 2018</td>
<td>Ionescu et al. (2016)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Prakash et al. (2012)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></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>
<td>• 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)</td>
<td>• Ketamine treatment effective for suicidal ideation (SI) in adults</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 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.</td>
<td>• SI severity improved independent of acute decrease in depression and SI intensity improved even if SI severity un-remitted</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Distinguished children with improvement and deterioration</td>
</tr>
</tbody>
</table>

Ionescu et al. (2016)

Prakash et al. (2012)
References for Psychometric Evidence and Clinical Outcomes


Representative Publications for C-SSRS Use:

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 10-18**

**Ages 11-17**


**Ages 12-17.5**

**Ages 12-18**


**Ages 13-17**


**Ages 14-19**


**Studies with Adolescents and Young Adults**

**Ages 13-25**


**Ages 14-39**


**Ages 15-20**

**Ages 15-24**


**Ages 20-22**


**School Protocols**


**Medical Specialties**

**Neurology**


**Oncology**

Psoriasis

Psychiatric Conditions
Alzheimer’s


ADHD


Autism

Bipolar Depression


**Complicated Grief**


**Generalized Anxiety Disorder (GAD)**


**Postpartum Depression**


**Psychosis/Schizophrenia**


**PTSD**


**Sleep**


**Healthcare Systems**


**Outpatient Settings**

**Outpatient Psychiatry**


**Juvenile Justice**


**Integrated Primary Care**


**Veterans**


**Emergency Departments: Identification of Risk and Prediction of Suicidal Behavior in Pediatric and Adult Patients**


In-Patient Psychiatric Settings: Identification of Risk and Prediction of Suicidal Behavior in Pediatric and Adult Patients


Mobile Crisis

Telemedicine

Medication Treatment Efficacy for Suicidal Outcomes

**Reviews of Suicide Risk Assessment Tools**


**Guidelines for Treatment & Assessment of Suicidal Outcomes**


**Linguistic and Psychometric Validation of Translations**


Cross-Cultural Settings

**Latin America (Spanish)**

**Australia**

**China**

**Croatia**

**Ethiopia**

**France**

**Germany**

**Hungary**

**Indonesia**

**India**

**Korea**


**Spain**


**Sri Lanka**


**Ethnic Groups**

**Asian Americans**


**C-SSRS Training Program Evaluations**


Columbia Suicide Severity Rating Scale Versions

C-SSRS Clinical Practice Screener:


C-SSRS Self-Report:


