The Columbia Lighthouse Project/Center for Suicide Risk Assessment

The Columbia Suicide Severity Rating Scale (C-SSRS)

Supporting Evidence

Last Revision
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# The Columbia Suicide Severity Rating Scale (C-SSRS): Psychometric Evidence

## Table 1: Studies Supporting Specific Psychometric Properties

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<th>Psychometric Property</th>
<th>Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical Utility</strong></td>
<td></td>
</tr>
<tr>
<td>Predictive and/or Incremental Validity</td>
<td>Brent et al., 2009^; Posner et al., 2011*^; Mundt et al., 2013*; Arias et al. 2013*; Greist et al. 2014*; Gipson et al., 2015^; Horwitz et al., 2015*; Brown et al., 2015*; Arias et al., 2016*; Conway et al. 2016^</td>
</tr>
<tr>
<td>Sensitivity to Change</td>
<td>Posner et al., 2011*; Ionescu et al., 2016*</td>
</tr>
<tr>
<td>Sensitivity and Specificity</td>
<td>Posner et al., 2011*; Mundt et al., 2013*; Viguera et al 2015*</td>
</tr>
<tr>
<td>Positive and Negative Predictive Value (PPV &amp; NPV)</td>
<td>Mundt et al 2013*; Viguera et al 2015*</td>
</tr>
<tr>
<td>Reliability (internal consistency)</td>
<td>Posner et al., 2011*^; Gunes et al. 2015^; Pai et al. 2015*</td>
</tr>
<tr>
<td>Reliability (inter-rater; multi-method agreement)</td>
<td>Kerr et al., 20136; Brent et al., 2009^; Hesdorffer et al., 2013*; Arias et al., 2013*; Brown et al. 2015*; Gunes et al. 2015^</td>
</tr>
<tr>
<td>Internal Structure (Factor Analysis)</td>
<td>Al-Halabi et al., 2016b*</td>
</tr>
<tr>
<td>Convergent Validity &amp; Accuracy</td>
<td>Posner et al., 2011*^; Kerr et al., 2013^; Gunes et al. 2015^; Pai et al. 2015*; Youngstrom et al. 2015*; Brown et al., 2015*</td>
</tr>
<tr>
<td>Divergent &amp; Discriminant Validity</td>
<td>Posner et al., 2011*^; Kerr et al., 2013^; Gunes et al. 2015</td>
</tr>
<tr>
<td>Cross-Cultural Validation</td>
<td>Danish (Conway et al. 2016^); Korean (Pai et al. 2015*); Turkish (Gunes et al. 2015*); Spanish (Al-Halabi et al., 2016ab*)</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><strong>Greist et al. 2014</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None Reported</td>
<td>Actual, interrupted or aborted attempts</td>
<td>All patients: 0.8% incidence rate, N=4975 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 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 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 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 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 OR= 18.70, 95% CI = 12.16 – 28.76, p &lt;0.001</td>
</tr>
<tr>
<td><strong>Posner et al. 2011</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline worst-point</td>
<td>Attempts</td>
<td>OR=1.45, 95% CI=1.07-1.98, p=0.02</td>
</tr>
<tr>
<td>Lifetime severity</td>
<td>Attempts</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>Attempts</td>
<td>OR=3.26, 95% CI=1.02-10.45, p=0.047</td>
</tr>
<tr>
<td>Actual, interrupted and aborted attempts</td>
<td>OR= 3.26, 95% CI=1.07-7.12, p=0.036</td>
<td></td>
</tr>
<tr>
<td><strong>Horwitz et al. 2015</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ideation severity 1 to 5</td>
<td>Attempt</td>
<td>OR= 1.51, 95% CI= 1.24-1.84, p&lt;0.001</td>
</tr>
</tbody>
</table>
### Predictive Validity - Suicidal Behavior

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Criterion</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<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><em>Interrupted Attempt</em></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><em>Aborted Attempt</em></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>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>
<tr>
<td><em>Attempt</em></td>
<td>Attempt</td>
<td>OR = 4.80, 95% CI = 2.23-10.32, p &lt; 0.001</td>
</tr>
<tr>
<td><em>NSSIB item</em></td>
<td>Attempt</td>
<td>OR = 3.12, 95% CI = 1.36-7.19, p &lt; 0.01</td>
</tr>
<tr>
<td><em>NSSIB item</em></td>
<td>Return ER visit</td>
<td>OR = 1.52, 95% CI = 1.08-2.12, p &lt; 0.05</td>
</tr>
<tr>
<td>Attempt</td>
<td></td>
<td>$X^2 = 4.131, df = 1, p = 0.04$</td>
</tr>
</tbody>
</table>

*Also see: Conway et al 2016.*
### Incremental Validity and Accuracy

<table>
<thead>
<tr>
<th>Study</th>
<th>Ideation Type</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brent et al., (2009):</td>
<td>Treatment resistant, depressed adolescent suicide attempters (N=334, ages 12-18)</td>
<td>Higher rates of suicidal (20.8% vs. 8.8%, chi squared= 9.18, df=1, p&lt;0.002) and non-suicidal self-injury (17.6% vs. 2.2%, chi squared= 23.47, df=1, p&lt;0.001) detected with systematic monitoring</td>
</tr>
</tbody>
</table>
| 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) |                         |
| Horwitz et al. (2014): Young adult psychiatric emergency patients (N=473) |                                                                                                                                                                                                                                                                                                                                                                                                   | Suicidal ideation added incremental validity to the prediction of future suicide attempts beyond the past suicide attempt, X²(1) = 7.54, p= .006 |                         |
| 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 |                         |

*Also see: Conway et al 2016.*

### Reliability - Suicidal Ideation  
(interrater 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)</td>
<td><strong>suicidal ideation ranging from 0 to 5</strong> <em>(from no ideation to suicidal ideation with intent and a clear plan)</em> monitored weekly</td>
<td>ICC = .09, p&lt; 0.001</td>
</tr>
<tr>
<td>Youngstrom et al. (2015)</td>
<td><strong>Accuracy calibrated against “missing gold standard” latent class-derived ideation and behavior categories</strong></td>
<td>κ &gt; 0.7</td>
</tr>
<tr>
<td>Study (Year)</td>
<td>Description</td>
<td>Reliability Measure</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------------</td>
</tr>
</tbody>
</table>
| Gunes et al. (2015)           | *Inter-rater reliability for the most severe ideation scores in the last month and lifetime were good* | Lifetime $\kappa = 0.91$  
                              |                                                                              | Recent $\kappa = 0.76$     |
| Hesdorffer et al. (2013)      | *Agreement between the MINI, C-SSRS and eC-SSRS for lifetime suicidal ideation* | $\kappa = 0.80$, 95% CI = 0.72-0.89 |

### Reliability - Suicidal Behavior

<table>
<thead>
<tr>
<th>Study (Year)</th>
<th>Description</th>
<th>Reliability Measure</th>
</tr>
</thead>
<tbody>
<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><em>Accuracy of attempt: calibrated against latent class-derived categories</em></td>
<td>$\kappa &gt; 0.8$</td>
</tr>
<tr>
<td>Brent et al. (2009)</td>
<td><em>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</em></td>
<td>100% agreement</td>
</tr>
<tr>
<td>Kerr et al. (2013)</td>
<td><em>Inter-rater agreement for distinction among actual, aborted, interrupted attempts, preparatory acts and any other act</em></td>
<td>$\kappa = 0.88$</td>
</tr>
<tr>
<td>Hesdorffer et al. (2013)</td>
<td><em>Agreement between the MINI, C-SSRS and eC-SSRS for lifetime suicidal behavior</em></td>
<td>$\kappa = 0.67$, 95% CI = 0.53-0.80</td>
</tr>
</tbody>
</table>
The Columbia Suicide Severity Rating Scale (C-SSRS): Suicide and Other Clinical Outcomes

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

<table>
<thead>
<tr>
<th>Decrease in Suicide Rate: C-SSRS as Intervention</th>
<th>Out-Patient Mental Health \nEsposito, 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Centerstone - the largest provider of community-based outpatient mental health care in the U.S.</td>
<td></td>
</tr>
<tr>
<td>• The C-SSRS administered to every client at every service delivery point as part of a comprehensive Zero Suicide prevention program.</td>
<td></td>
</tr>
<tr>
<td>• In the first 20 months post-implementation, the Tennessee facilities saw a nearly 65% reduction in the suicide rate, from 3.1 to 1.1 per 10,000 clients.</td>
<td></td>
</tr>
</tbody>
</table>

| Active Duty: US Marines \nSeck, 2015 | • Following training of all support staff in the C-SSRS at 16 USMC installations and implementation of mandatory C-SSRS screening by the non-healthcare personnel, including legal services, suicides in the USMC dropped by 22%, from 45 in 2013 to 34 in 2014. |

| States: Utah \nUS: UT Dept. of Human Services, 2015 | • For the first time reversed the rising suicide trend since implementing the C-SSRS as part of the comprehensive Zero Suicide program in 2015. |

<p>| Active Duty: US Army \nAdam Walsh, CIV DODHRA DSPO (US), (2015, personal communication) | • At the end of 2-4 months of treatment for PTSD in active duty soldiers (N=1206), those with greater improvement in PTSD had fewer suicidal ideation symptoms on the C-SSRS. |</p>
<table>
<thead>
<tr>
<th>C-SSRS as an Effective Measure for Diagnosis &amp; Treatment</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Veterans</strong>&lt;br&gt;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>
<td></td>
</tr>
<tr>
<td><strong>Veterans</strong>&lt;br&gt;Harvey et al. (2014)&lt;br&gt;(suicide analyses in preparation)</td>
<td>• Preliminary analyses show higher prevalence of suicidal ideation and behavior among the Vets with Bipolar Disorder than Schizophrenia.&lt;br&gt;• Different patterns of association with medical, psychiatric disorders and demographic characteristics between BP and SZ groups</td>
<td></td>
</tr>
<tr>
<td><strong>Medication Treatment Efficacy</strong>&lt;br&gt;Ionescu et al. (2016)&lt;br&gt;Prakash et al. (2012)</td>
<td>• Ketamine treatment effective for suicidal ideation (SI) in <strong>adults</strong>&lt;br&gt;• SI severity improved independent of acute decrease in depression and SI intensity improved even if SI severity un-remitted&lt;br&gt;• Duloxetine was effective in treating suicidal ideation among <strong>children ages 7-17</strong> with major depression&lt;br&gt;• Distinguished children with improvement and deterioration</td>
<td></td>
</tr>
</tbody>
</table>
References for Psychometric Evidence and Clinical Outcomes


Representative Publications for C-SSRS Use:
Demographic and Clinical Populations, Settings, Treatment Response 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 7-13**

**Ages 6-17**

**Ages 6-18**

**Ages 7-17**

**Ages 10-18**
Ages 12-17


Ages 7-18 (for pediatric sub-sample; study also includes adults)


Ages 12-17.5


Ages 12-18


Ages 12-18


Ages 12-17


Ages 13-17


Ages 14-18

Ages 14-19


Ages 15-20

Ages 15-24

Young Adults
Ages 15-24

Ages 20-22

Medical Specialties

Neurology


Oncology


Psychiatric Conditions

Autism


Bipolar Depression


Complicated Grief


Psychosis


PTSD

Healthcare Systems

Outpatient Settings

Outpatient Psychiatry

Juvenile Justice


Integrated Primary Care

Veterans

**In-Patient Settings/Emergency Departments**


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)**


**Argentina**


**Australia**


**China**


**Croatia**


**Ethiopia**


**France**

Germany

Hungary

Indonesia

Korea

Spain

Sri Lanka