

The Columbia Lighthouse Project/Center for Suicide Risk Assessment

The Columbia Suicide Severity Rating Scale (C-SSRS)

Supporting Evidence

Last Revision
11-2-2016

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

Table 1: Studies Supporting Specific Psychometric Properties

Psychometric Property		Studies
Clinical Utility	Predictive and/or Incremental Validity	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 [^]
	Sensitivity to Change	Posner et al., 2011 [*] ; Ionescu et al., 2016 [*]
	Sensitivity and Specificity	Posner et al., 2011 [*] ; Mundt et al., 2013 [*] ; Viguera et al 2015 [*]
	Positive and Negative Predictive Value (PPV & NPV)	Mundt et al 2013 [*] ; Viguera et al 2015 [*]
Reliability (internal consistency)		Posner et al., 2011 ^{*^} ; Gunes et al. 2015 [^] ; Pai et al. 2015 [*]
Reliability (inter-rater; multi-method agreement)		Kerr et al., 2013 ⁶ ; Brent et al., 2009 [^] ; Hesdorffer et al., 2013 [*] ; Arias et al., 2013 [*] ; Brown et al. 2015 [*] ; Gunes et al. 2015 [^]
Internal Structure (Factor Analysis)		Al-Halabi et al ., 2016b [*]
Convergent Validity & Accuracy		Posner et al., 2011 [*] ; Kerr et al., 2013 [^] ; Gunes et al. 2015 [^] ; Pai et al. 2015 [*] ; Youngstrom et al. 2015 [*] ; Brown et al ., 2015 [*]
Divergent & Discriminant Validity		Posner et al., 2011 [*] ; Kerr et al., 2013 [^] ; Gunes et al. 2015
Cross-Cultural Validation		Danish (Conway et al. 2016 [^]); Korean (Pai et al. 2015 [*]); Turkish (Gunes et al. 2015 [*]); Spanish (Al-Halabi et al ., 2016ab [*])

* studies include adult samples; ^ studies include pediatric samples

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

Predictive Validity - Suicidal Ideation			
	Predictor	Criterion	Coefficients
Greist et al. 2014	<i>None Reported</i>	Actual, interrupted or aborted attempts	<u>All patients</u> : 0.8% incidence rate, N=4975 <u>Psychiatric patients</u> : 1.1% incidence rate, N=3184
	<i>Wish to Be Dead</i>	Actual, interrupted or aborted attempts	OR= 6.21, 95% CI = 4.18 – 9.23, p <0.001 OR= 4.99, 95% CI = 3.29 – 7.56, p <0.001
	<i>Non-Specific Active Thoughts</i>	Actual, interrupted or aborted attempts	OR= 6.69, 95% CI = 4.16 – 10.76, p <0.001 OR= 5.53, 95% CI = 3.38-9.04, p <0.001
	<i>Active with any methods (not plan) w/o intent to act</i>	Actual, interrupted or aborted attempts	OR= 11.16, 95% CI = 7.43-16.76, p <0.001 OR= 8.36, 95% CI = 5.44-12.84, p <0.001
	<i>Active with Some Intent to Act, without specific plan</i>	Actual, interrupted or aborted attempts	OR= 19.27, 95% CI = 12.97 – 28.63, p <0.001 OR= 15.24, 95% CI = 10.07-23.09, p <0.001
	<i>Active with specific plan and intent</i>	Actual, interrupted or aborted attempts	OR= 25.53, 95% CI = 16.94 – 38.47, p <0.001 OR= 18.70, 95% CI = 12.16 – 28.76, p <0.001
Posner et al. 2011	<i>Baseline worst-point</i>	Attempts	OR=1.45, 95% CI=1.07-1.98, p=0.02
		Actual, interrupted and aborted attempts	OR=1.34, 95% CI=1.05-1.70, p=0.02
	<i>Lifetime severity</i>	Attempts	OR=1.43, 95% CI=0.99-2.05, p=0.05
	<i>Severity 4-5 (any intent to act)</i>	Attempts	OR=3.26, 95% CI=1.02-10.45, p=0.047
		Actual, interrupted and aborted attempts	OR= 3.26, 95% CI=1.07-7.12, p=0.036
Horwitz et al. 2015	<i>Ideation severity 1 to 5</i>	Attempt	OR= 1.51, 95% CI= 1.24-1.84, p<0.001

Arias et al. 2016	<i>Current ideation severity 4 or 5 (with intent to die)</i>	Actual attempt or suicide 6 weeks post-ED visit	OR=1.70 95% CI 1.18-2.44, p =.004
		Actual, interrupted, aborted attempts, suicide or preparatory behavior	OR =1.52 95%CI 1.23-1.86 p < .001
Predictive Validity - Suicidal Behavior			
Greist et al. 2014	Predictor	Criterion	Coefficients
	<i>Attempt</i>	Actual, interrupted or aborted attempts	OR=4.57, 95% CI = 3.6-5.7, p<0.001
	<i>Interrupted Attempt</i>	Actual, interrupted or aborted attempts	OR=5.55, 95% CI = 4.4-7.0, p<0.001
	<i>Aborted Attempt</i>	Actual, interrupted or aborted attempts	OR=5.09, 95% CI = 4.1-6.4, p<0.001
	<i>Preparatory behavior</i>	Actual, interrupted or aborted attempts	OR=5.69, 95% CI = 4.3-7.5, p<0.001
Horwitz et al. 2015	<i>Attempt</i>	Attempt	OR=4.80, 95% CI = 2.23-10.32, p<0.001
	<i>NSSIB item</i>	Attempt	OR=3.12, 95% CI = 1.36-7.19, p<0.01
Gipson et al. 2014	<i>NSSIB item</i>	Return ER visit	OR = 1.52; 95% CI, 1.08-2.12, p<.05
		Attempt	$\chi^2 = 4.131, df = 1, p = 0.04$

Also see: Conway et al 2016.

Incremental Validity and Accuracy

Brent et al., (2009): Treatment resistant, depressed adolescent suicide attempters (N=334, ages 12-18)	<ul style="list-style-type: none"> 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
Brown et al. (2015): psychiatric ER patients (N=250)	<ul style="list-style-type: none"> 18% (n=23) of patients with a <u>suicide attempt</u> in the past week misclassified or missed by clinical assessment. Agreement with clinical assessment for <u>suicide attempts</u> (K=0.76, p<.001) Agreement with clinical assessment of <u>non-suicidal self-injurious behavior</u> (K=0.72, p<.001)
Horwitz et al. (2014): Young adult psychiatric emergency patients (N=473)	<ul style="list-style-type: none"> Suicidal ideation added incremental validity to the prediction of future suicide attempts beyond the past suicide attempt, $X^2(1) = 7.54, p = .006$
Arias et al. (2013): 497 ER adult patients with suicidal thoughts or attempt(s)	<ul style="list-style-type: none"> 41% increase in the detection of <u>suicide attempts</u> 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 (inter-rater and multi-method agreement)

Study	Ideation Type	Coefficients
Brent et al. (2009)	<i>suicidal ideation ranging from 0 to 5 (from no ideation to suicidal ideation with intent and a clear plan) monitored weekly</i>	ICC = .09, p< 0.001
Youngstrom et al. (2015)	<i>Accuracy calibrated against "missing gold standard" latent class-derived ideation and behavior categories</i>	$\kappa > 0.7$

Gunes et al. (2015)	<i>Inter-rater reliability for the <u>most severe ideation scores</u> in the last month and lifetime were good</i>	Lifetime $\kappa = 0.91$ Recent $\kappa = 0.76$
Hesdorffer et al. (2013)	<i>Agreement between the MINI, C-SSRS and eC-SSRS for lifetime <u>suicidal ideation</u></i>	$\kappa = 0.80$, 95% CI = 0.72-0.89
Reliability - Suicidal Behavior		
Brown et al. (2015)	<i>Agreement with clinical assessment for <u>attempts</u></i>	$\kappa = 0.76$, $P < .001$
	<i>Agreement with clinical assessment for <u>non-suicidal self-injurious behavior</u></i>	$\kappa = 0.72$, $P < .001$
Youngstrom et al. (2015)	<i>Accuracy of <u>attempt</u>: calibrated against latent class-derived categories</i>	$\kappa > 0.8$
Brent et al. (2009)	<i>Inter-rater reliability for a rating of <u>suicidal behavior, ranging from 0 to 5</u> (no behavior to multiple attempts during the assessment period) using the Columbia Classification Algorithm of Suicide Assessment</i>	100% agreement
Kerr et al. (2013)	<i>Inter-rater agreement for distinction among <u>actual, aborted, interrupted attempts, preparatory acts and any other act</u></i>	$\kappa = 0.88$
Hesdorffer et al. (2013)	<i>Agreement between the MINI, C-SSRS and eC-SSRS for lifetime <u>suicidal behavior</u></i>	$\kappa = 0.67$, 95% CI = 0.53-0.80

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

Decrease in Suicide Rate: C-SSRS as Intervention	Out-Patient Mental Health Esposito, 2015	<ul style="list-style-type: none"> Centerstone - the largest provider of community-based outpatient mental health care in the U.S. The C-SSRS administered to every client at every service delivery point as part of a comprehensive Zero Suicide prevention program. 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.
	Active Duty: US Marines Seck, 2015	<ul style="list-style-type: none"> 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 US: UT Dept. of Human Services, 2015	<ul style="list-style-type: none"> For the first time reversed the rising suicide trend since implementing the C-SSRS as part of the comprehensive Zero Suicide program in 2015.
	Active Duty: US Army Adam Walsh, CIV DODHRA DSPO (US), (2015, personal communication)	<ul style="list-style-type: none"> 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.

Table 3: (Continued)

C-SSRS as an Effective Measure for Diagnosis & Treatment	Veterans Legarreta et al., 2015	<ul style="list-style-type: none"> The association of specific PTSD symptoms with suicidal ideation and behavior suggested individual PTSD symptoms as treatment target for reducing suicidal outcomes.
	Veterans Harvey et al. (2014) (suicide analyses in preparation)	<ul style="list-style-type: none"> Preliminary analyses show higher prevalence of suicidal ideation and behavior among the Vets with Bipolar Disorder than Schizophrenia. Different patterns of association with medical, psychiatric disorders and demographic characteristics between BP and SZ groups
	Medication Treatment Efficacy Ionescu et al. (2016) Prakash et al. (2012)	<ul style="list-style-type: none"> Ketamine treatment effective for suicidal ideation (SI) in adults SI severity improved <u>independent</u> of acute decrease in depression and SI intensity improved <u>even if SI severity un-remitted</u> Duloxetine was effective in treating suicidal ideation among children ages 7-17 with major depression Distinguished children with improvement and deterioration

References for Psychometric Evidence and Clinical Outcomes

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Representative Publications for C-SSRS Use:

Demographic and Clinical Populations, Settings, Treatment Response and Assessment Guidelines

Pediatric Populations by Age Group

Ages 5-11

Glennon, J., Purper-Ouakil, D., Bakker, M., Zuddas, A., Hoekstra, P., Schulze, U., ... & Coghill, D. (2014). Paediatric European Risperidone Studies (PERS): context, rationale, objectives, strategy, and challenges. *European child & adolescent psychiatry*, 23(12), 1149-1160. [also includes 12-17.5 age group]

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

Weinstein, S. M., Henry, D. B., Katz, A. C., Peters, A. T., & West, A. E. (2015). Treatment moderators of child-and family-focused cognitive-behavioral therapy for pediatric bipolar disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, 54(2), 116-125.

Ages 6-17

Glennon, J., Purper-Ouakil, D., Bakker, M., Zuddas, A., Hoekstra, P., Schulze, U., ... & PERS Consortium. (2014). Paediatric European Risperidone Studies (PERS): context, rationale, objectives, strategy, and challenges. *European child & adolescent psychiatry*, 23(12), 1149-1160.

Ages 6-18

Wigal, S. B., Nordbrock, E., Adjei, A. L., Childress, A., Kupper, R. J., & Greenhill, L. (2015). Efficacy of Methylphenidate Hydrochloride Extended-Release Capsules (Aptensio XR™) in Children and Adolescents with Attention-Deficit/Hyperactivity Disorder: A Phase III, Randomized, Double-Blind Study. *CNS drugs*, 29(4), 331-340.

Ages 7-17

Prakash, A., Lobo, E., Kratochvil, C. J., Tamura, R. N., Pangallo, B. A., Bullok, K. E., ... & March, J. S. (2012). An open-label safety and pharmacokinetics study of duloxetine in pediatric patients with major depression. *Journal of child and adolescent psychopharmacology*, 22(1), 48-55.

Ages 10-18

Scott, M., Underwood, M., & Lamis, D. A. (2015). Suicide and Related-Behavior Among Youth Involved in the Juvenile Justice System. *Child and Adolescent Social Work Journal*, 32(6), 517-527.

Ages 12-17

Findling, R. L., Cutler, A. J., Saylor, K., Gasior, M., Hamdani, M., Ferreira-Cornwell, M. C., & Childress, A. C. (2013). A long-term open-label safety and effectiveness trial of lisdexamfetamine dimesylate in adolescents with attention-deficit/hyperactivity disorder. *Journal of child and adolescent psychopharmacology*, 23(1), 11-21.

Findling, R.L., A. Robb, and A. Bose, *Escitalopram in the treatment of adolescent depression: a randomized, double-blind, placebo-controlled extension trial.* J Child Adolesc Psychopharmacol, 2013. 23(7): p. 468-80.

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

Gibbons, R. D., Brown, C. H., Hur, K., Davis, J. M., & Mann, J. J. (2012). Suicidal thoughts and behavior with antidepressant treatment: reanalysis of the randomized placebo-controlled studies of fluoxetine and venlafaxine. *Archives of general psychiatry*, 69(6), 580-587.

Ages 12-17.5

Glennon, J., Purper-Ouakil, D., Bakker, M., Zuddas, A., Hoekstra, P., Schulze, U., ... & Coghill, D. (2014). Paediatric European Risperidone Studies (PERS): context, rationale, objectives, strategy, and challenges. *European child & adolescent psychiatry*, 23(12), 1149-1160.

Ages 12-18

Posner, K., Brown, G. K., Stanley, B., Brent, D. A., Yershova, K. V., Oquendo, M. A., ... & Mann, J. J. (2011). The Columbia–Suicide Severity Rating Scale: initial validity and internal consistency findings from three multisite studies with adolescents and adults. *American Journal of Psychiatry*, 168(12), 1266-1277.

Ages 12-18

Brent, D., Emslie, G., Clarke, G., Asarnow, J., Spirito, A., Ritz, L., ... & Keller, M. (2009). Predictors of spontaneous and systematically assessed suicidal adverse events in the treatment of SSRI-resistant depression in adolescents (TORDIA) study. *American Journal of Psychiatry*, 166(4), 418-426.

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Ages 12-17

Emslie, G. J., Ventura, D., Korotzer, A., & Tourkodimitris, S. (2009). Escitalopram in the treatment of adolescent depression: a randomized placebo-controlled multisite trial. *Journal of the American Academy of Child & Adolescent Psychiatry*, 48(7), 721-729.

Ages 13-17

King, C. A., Jiang, Q., Czyz, E. K., & Kerr, D. C. (2014). Suicidal ideation of psychiatrically hospitalized adolescents has one-year predictive validity for suicide attempts in girls only. *Journal of abnormal child psychology*, 42(3), 467-477.

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Ages 14-18

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Ages 14-19

Kaplow, J. B., Gipson, P. Y., Horwitz, A. G., Burch, B. N., & King, C. A. (2014). Emotional suppression mediates the relation between adverse life events and adolescent suicide: Implications for prevention. *Prevention Science*, *15*(2), 177-185.

King, C. A., Berona, J., Czyz, E., Horwitz, A. G., & Gipson, P. Y. (2015). Identifying Adolescents at Highly Elevated Risk for Suicidal Behavior in the Emergency Department. *Journal of child and adolescent psychopharmacology*.

Ages 15-20

Gray, K. M., Carpenter, M. J., Lewis, A. L., Klintworth, E. M., & Upadhyaya, H. P. (2012). Varenicline versus bupropion XL for smoking cessation in older adolescents: A randomized, double-blind pilot trial. *Nicotine & Tobacco Research*, *14*(2), 234-239.

Ages 15-24

Horwitz, A. G., Czyz, E. K., & King, C. A. (2015). Predicting future suicide attempts among adolescent and emerging adult psychiatric emergency patients. *Journal of Clinical Child & Adolescent Psychology*, *44*:5, 751-761.

Young Adults**Ages 15-24**

Horwitz, A. G., Czyz, E. K., & King, C. A. (2015). Predicting future suicide attempts among adolescent and emerging adult psychiatric emergency patients. *Journal of Clinical Child & Adolescent Psychology*, *44*:5, 751-761.

Ages 20-22

Cáceda, R., Durand, D., Cortes, E., Prendes-Alvarez, S., Moskovciak, T., Harvey, P. D., & Nemeroff, C. B. (2014). Impulsive choice and psychological pain in acutely suicidal depressed patients. *Psychosomatic medicine*, *76*(6), 445-451.

Medical Specialties**Neurology**

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Cross-Cultural Settings

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