

Overview of the development and testing of the SACS

The SACS instrument was developed via a two-stage process. Firstly, a consultation and pilot phase was undertaken. Secondly, the instrument underwent psychometric testing.

Development stage

- A preliminary version of the SACS instrument was developed for the first stage of the project. This was informed by a literature review, which shaped the nature and content of the items included for measurement, as well as the overall design of the instrument. Some questions were created and others from established screening and outcome measurement instruments were adapted to the SDQ format. At the outset, twenty-eight SACS items were assembled in a preliminary instrument.
- Consultation around this initial version of the instrument was undertaken with youth health and AOD workers via an email questionnaire.
- The preliminary instrument was then administered to young people attending youth AOD treatment services. After completing the preliminary SACS instrument alone, participants were interviewed about the understandability, acceptability and face validity of each of the SACS items via a researcher-administered questionnaire. The feedback from both clinicians and clients led to modifications of the SACS instrument and the removal of thirteen items.
- A focus group of young people who were past or present consumers of a youth health service (non-AOD) then participated in a similar consultation process.
- Following this, the fifteen item instrument was piloted in a combined clinical and community (secondary school pupils) population. Item analysis (using discriminant function analysis) of the participants' responses was carried out to ascertain both the validity of the scoring system and the relative discriminant values of each item. Using these results, and with reference to the literature, the final combination of ten SACS items was obtained.

Psychometric testing stage

- Psychometric testing was undertaken on a sample of 651 young people, drawn from three secondary schools ('community' sample, n=531) and three treatment agencies ('clinical' sample, n=120). All participants were aged between 13 and 18 years.
- 'Community' participants completed the SACS questionnaire at their school, in a confidential setting. Classes were attended by members of the research team who provided an overview of the SACS project, distributed questionnaires and other documentation, and who were present throughout the data collection process.
- 'Clinical' participants completed the instrument during a regular counseling session at their treatment service. Their clinician provided an overview of the SACS project, and was present throughout the process.
- The SACS was administered with the SDQ and two validated adolescent AOD instruments (Knight et al, 2003), the CRAFFT and the Problem Oriented Screening Instrument for Teenagers (POSIT). The CRAFFT is a brief, valid six item screening instrument that asks for Yes/No responses to questions about past substance use behaviours (i.e. have you ever?). The POSIT is a 150 item instrument made up of a number of subscales. We utilised the substance use subscale (17 items), which has been validated for use alone. The entire clinical population completed both the CRAFFT and the POSIT. Community participants completed either the CRAFFT or the POSIT but not both.
- The SACS was administered a second time to two smaller subsets of the community population at intervals of one and three weeks to ascertain test-retest reliability.
- The SACS was also administered a second time (four to eight weeks later) to a subset of the treatment population to assess its capacity to measure change over a treatment period.

Psychometric properties of the SACS difficulties scale

Reliability

- Internal consistency

- *Coefficient Alpha* = 0.91.
- *Split-half reliability* - The Spearman-Brown corrected correlation (split-half coefficient) = 0.93.

- Test-retest reliability (stability)

- 1 week test-retest stability coefficient = 0.91 ($p < 0.01$)
- 3 week test-retest stability coefficient = 0.88 ($p < 0.01$)

Validity

- Congruent Validity

- Congruent validity coefficients were obtained from comparing the SACS difficulties score against two established youth AOD instruments
- The CRAFFT ($n = 366$), Pearson correlation coefficients (r) = 0.80 ($p < 0.01$)
- POSIT ($n = 382$), Pearson correlation coefficients (r) = 0.90 ($p < 0.01$).

- Concurrent validity - Receiver operating characteristics (ROC)

A ROC curve estimate (no cross-validation) was calculated using the SACS difficulties score to predict membership of the clinical or community sample. The area under the curve was 91% indicating high predictive value for the test. A SACS score of 2/20 predicted membership of the clinical group with a sensitivity of 86% and a specificity of 81%.

- Construct Validity

Principle components analysis (unrotated) of the SACS difficulties items yielded two factors that accounted for 49% of the item variance. All items loaded onto the first factor accounting for 37% of the variance. All items loaded higher on the first factor than for the second factor except for item 10.

Ability to detect change

Forty six clinical cases that actively remained in treatment, repeated the SACS after 4 weeks (mean repeat interval was 5 weeks). The mean (sd) SACS difficulties score for the first administration was 9.2 (5.1) and for the second, 5.3 (4.2), a difference of 3.9. (paired t-test; mean diff. = 3.91, SD = 5.31, $t(45) = 5.00$, $p < 0.01$). To determine whether this difference represented a significant change over time a one-way within-subjects general linear model for repeated measures was conducted, indicating a significant time effect in the treatment sample (Wilks' Lambda = 0.64, $F(1,45) = 25$, $p < 0.01$). A similar analysis conducted on the 3-week retest non-treatment sample revealed no significant difference between the mean scores over time.