A Confirmatory Factor Analysis of the Toronto Alexithymia Scale (TAS-20)

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What is The Toronto Alexithymia Scale (TAS-20)?

The Toronto Alexithymia Scale (TAS-20; Bagby et al., 2020), initially developed in 1985, is one of the most widely used instruments to measure alexithymia. Alexithymia refers to the limited capability to access, discern, and communicate emotions. Due to the accessibility of the instrument, researchers have continued to evaluate the instruments effectiveness evidenced by item reduction, application to various populations, and psychometric testing. Using a 5-point Likert-type scale, the self report scale measures three dimensions of alexithymia: difficulty distinguishing feelings (7 items), difficulty communicating feelings (5 items), and externally oriented thinking (8 items). Total scores range from 20-100 (The three subcategories have 5 items each with potential scores ranging from 7–35 for DIF, 5–25 for DDF, and 8–40 for EOT.)

Introduction, Significance and Research Questions

Aim: Analyze the internal structure of the TAS-20 developed by Bagby et al. (1994) and its applicability to college student populations in the southeastern United States

Research Questions: What is the most reliable and valid factor structure of the TAS-20 scale in college student populations

Through confirmatory factor analysis of five separate models discussed previously in research, which version has the best psychometric properties and model fit indices?

Purpose: The purpose of this study is to evaluate the application of a one-, two-, three-, alternative three-, and four- factor model to the TAS-20.

Rationale: Some research studies have conflicted Bagby et al.'s (1994) findings on the TAS-20's factors and effective models (i.e. nested factors, number of factors).

Methodology & Participant Procedures

The TAS-20 was administered to 360 students, over a period of 6 months, recruited from eleven undergraduate psychology classes offered by Tennessee Technological University.

Final Sample: 354 college-aged students (*n*= 357; 63.1% male, age 18-57 years; *M*=19.40).

Study Design: structural equation modeling, specifically confirmatory factor analysis (CFA) to evaluate a priori factor models.

The CFA employed maximum likelihood discrepancy for covariance analysis, standardized estimate analyses, correlation matrix analyses, and orthogonal (varimax) rotations.

All analyses for the EFA and descriptive analysis of participants for the CFA were performed using SPSS. All other analyses for this investigation were performed using the AMOS 26 statistical package developed by IBM Corp.

Data Analysis Procedures

Confirmatory factor analysis (CFA) and structural equation modeling (SEM) analyses were used to evaluate factor models on the following indices: goodness of fit (GFI), comparative fit (CFI and TLI), absolute fit (SRMR), and parsimony correction (RMSEA).

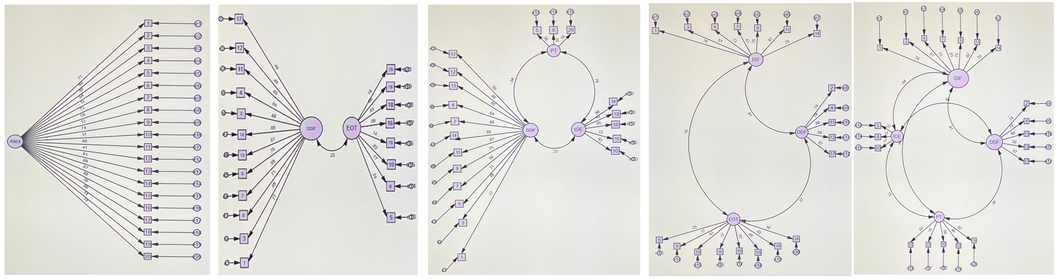
For this study, the Hair et al. (2010) recommendations were used to identify adequate model fit scores by the following benchmarks:

GFI	AGFI	SRMR	CFI	TLI	SRMR	RMSEA
≥ .90	≥ .80	< .08	≥ .90	≥ .90	< .08	< .08

Best practices in reporting CFA results were followed as chi square is reported despite its limited interpretation for model fit comparisons due to the larger sample size (n=357) which produced statistically significant results for each model

Results

Model Fit Indices *(How well does the results fit?)*



	Single Factor	Two Factor	Three Factor	Three Factor Alternative	Four Factor
X^2	614.081	502.894	331.044	452.973	400.863
df	170	169	149	166	164
X^2/df	3.771	2.975	2.222	2.729	2.444
CFI	.788	.84	.907	.863	.887
TLI	.764	.821	.893	.844	.869
SRMR	.080	.075	.066	.073	.067
RMSEA	.085	.074	.058	.069	.063

Conclusion

The main purposes of this study was to evaluate the internal structure and properties of the TAS-20. Additionally, if the TAS-20 could be validated within undergraduate college student populations within the southeastern United States. The hypothesis of this study, based on a priori models, was that the TAS-20 was a valid and reliable measure for usage with college student populations. The validation of this scale within the target population was evident in the data analysis.

In reflection of the data analysis, continued evaluation of the TAS-20, specifically using structural equation modeling, is necessary to detect problematic levels of error correlations, understand the extent to which measurement errors to correlate, increase reliability, and to provide researchers with greater information to assess item retention, deletion, or modification decisions. We also recommend further evaluation of necessary items. After performing the CFA, we noticed a more suitable factor structure emerged after removing three items. The original three factor model remained the most suitable; however, the psychometrics were notably improved.

When using nonclinical, university based student populations, we suggest considering the extent of non-continual, external stressors may be impacting the data. For example, we suggest evaluating when the test was given and if students were nearing and/or just finishing summative testing. Additionally, the examination of test-retest changes may be particularly beneficial when using student populations to account for heightened stress.

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