

Applicability and validation of the Reaction to Test (RTT) in a sample of Portuguese Medical students

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Introduction

- Test anxiety has been a frequent phenomenon in higher education students with consequences on academic performance.
- Test anxiety can have an impact on the learning process and can be experienced before, during and even persist after the exam.⁽¹⁾
- While some students may be motivated by test anxiety to focus on their tasks, others may experience a debilitating form of anxiety often leading to a negative academic achievement.⁽²⁾
- The construction and validation of scales may allow an advance in research that explores the impact of anxiety in evaluative contexts on performance.

Objectives

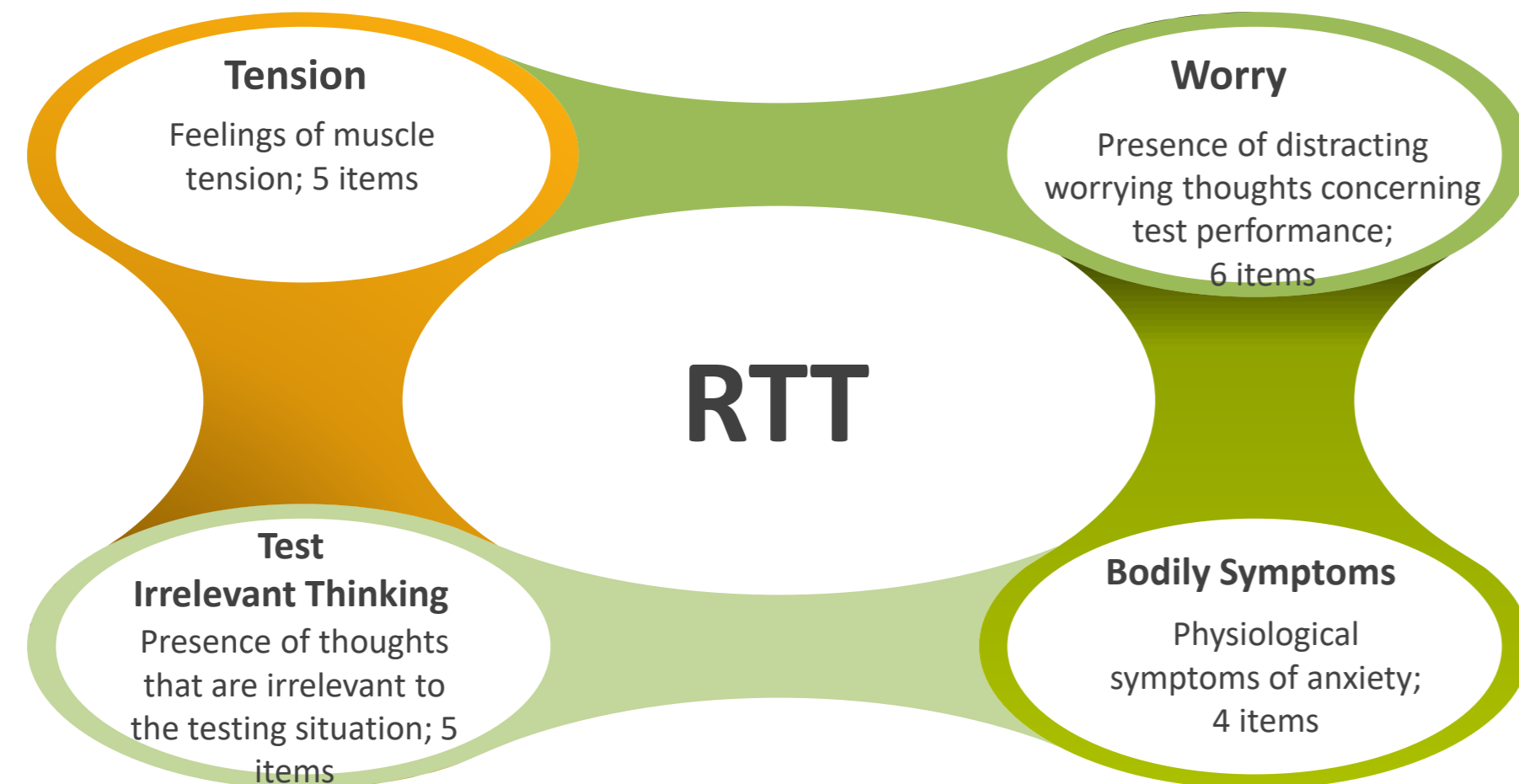
- To validate the Reactions to Tests Scale (RTT; Benson & Bandalos, 1992) based on the four-factor dimensionality test anxiety of Sarason (1984).
- To explore the RTT psychometrics properties in a sample of Portuguese medical students.

Methods

Instruments

1) Reactions to Tests Scale (RTT; Benson & Bandalos, 1992)

- A measure of test anxiety based on the interference model proposed by Sarason (1984). It evaluates four dimensions of test anxiety:



- 20-items on a four-point Likert format scale: 1 = *not all typical of me*; 2 = *only somewhat typical of me*; 3 = *quite typical of me* and 4 = *very typical of me*.

2) State-Trait Anxiety Inventory (STAI-Y; Silva, 2003)

- A measure of anxiety composed by two subscales with 20 items allocated to each of them: the State Anxiety subscale (S-Anxiety) and the Trait Anxiety subscale (T-Anxiety)

Procedures

- Adaptation process of the RTT according to the following steps: (1) translation of the English version to Portuguese by one person without prior knowledge and two with knowledge in the area; (2) direct comparison of the translated versions and synthesis of a single Portuguese version of RTT; (3) back-translation and (4) pilot test of the pre-final Portuguese version on a sample of medical students (n=67).
- The final version was applied to the participants in the validation phase of the study.

Participants

- Students from pre-clinical and clinical years of the medical course at the School of Medicine of the University of Minho (MedUM), Braga, Portugal.
- Final sample = 393 undergraduate medical students (n=631, total response of 62%; 69% for the pre-clinical years (274/399) and 51% for the clinical years (119/232).
- 293 females (75%) with a mean age of 21.43 (SD = 2.733).

Statistical Analyses

- Four-factor structure and second order factor of the scale determined via confirmatory factor analysis.
- Cronbach's alpha and composite reliability used to assess internal consistency.
- Convergent validity was evaluated through the correlation between the RTT and STAI-Y and computing the average variance extracted.
- IBM SPSS version 25 and Analysis of Moment Structures (AMOS) were used for the analyses.

Results/Discussion

Confirmatory Factor Analysis

- Results support the four-factor structure for first-order factor model.
- Two goodness-of-fit indexes indicate acceptable fit and two suggest a good model of fit. (table 1)
- Both first-and-second order models were acceptable, although the first-order factor model with correlated errors was considered the most satisfactory.

Table 1. Goodness of fit indexes for Portuguese RTT.

	X ²	df	X ² /df	TLI	CFI	RMSEA	AIC
1. 1 st order model	462.877 ^a	164	2.822	.90	.92	0.68	594.877
2. Modified 1 st order model	356.851 ^a	162	2.203	.94	.95	.055	492.851
3. 2 nd order model	516.540 ^a	166	3.112	.89	.90	.073	644.540
4. Modified 2 nd order model	406.763 ^a	164	2.480	.92	.93	.061	538.763
Difference between models 2 and 4	49.912 ^a	2	-	-	-	-	-

^ap < .001; X²: chi-square; X²/df, chi-square by degrees of freedom ratio; TLI, Tucker-Lewis index; CFI, comparative fit index; RMSEA, root mean square error of approximation; AIC, akaike information criterion.

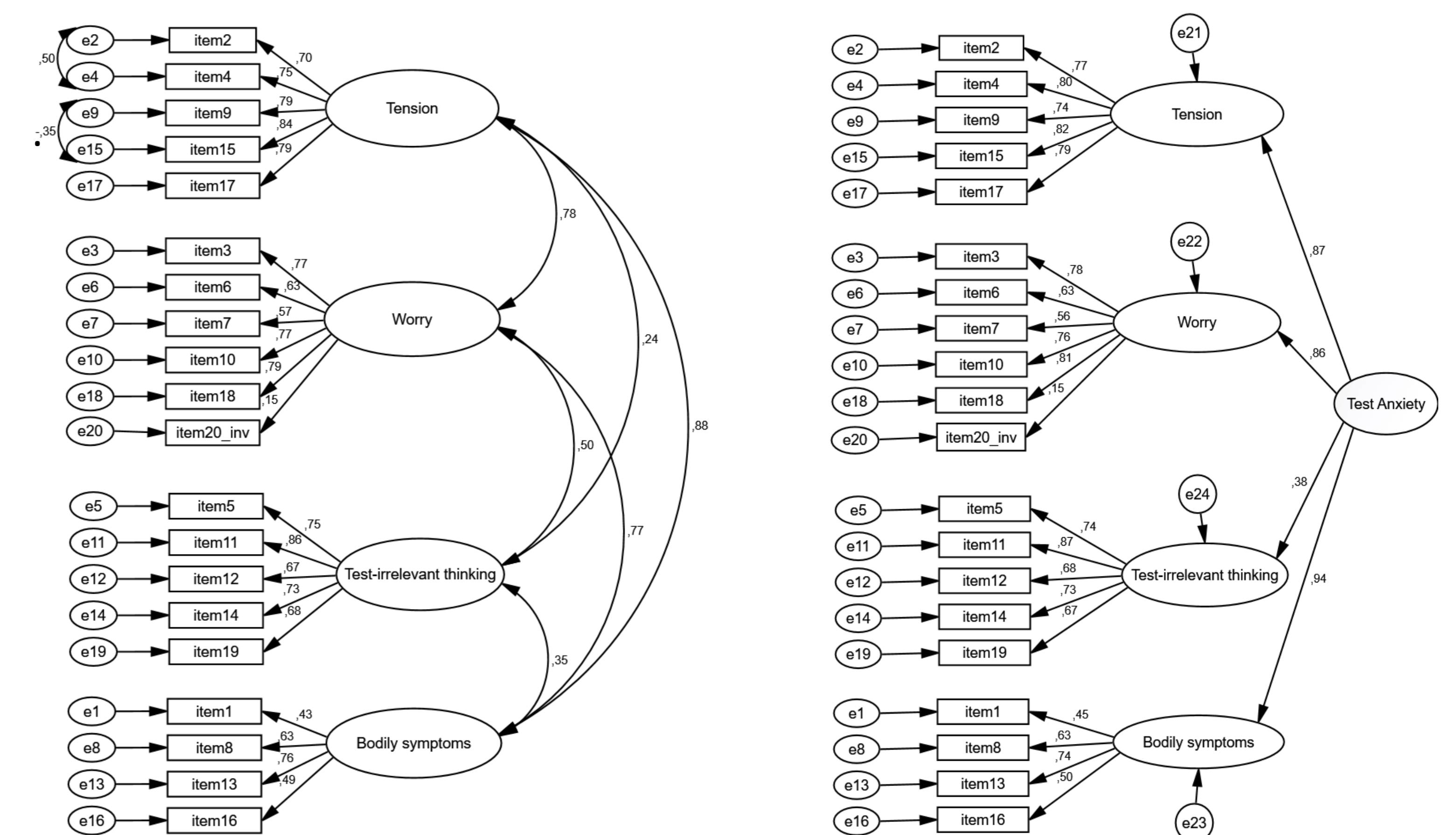


Figure 1 and 2. First and second order factor models of the RTT 20-item.

Convergent validity and internal consistency

Table 2. Correlations, variances and covariances of RTT subscales, total scale and STAI-Y.

	RTT Tension	RTT Worry	RTT Test Irrelevant Thinking	RTT Bodily Symptoms	RTT Total Scale
RTT Tension	0.588	0.320	0.108	0.356	0.341
RTT Worry	0.639**	0.426	0.213	0.260	0.313
RTT Test Irrelevant Thinking	0.191**	0.445**	0.542	0.152	0.257
RTT Bodily Symptoms	0.654**	0.562**	0.291**	0.502	0.306
RTT Total Scale	0.806**	0.870**	0.632**	0.781**	0.305
STAI - S	0.108*	0.010	0.100	0.196**	0.125*

*p < .05, **p < .01. The top half of the table represents the covariance between the different scales. The bottom half of the table represents the Pearson correlation coefficients between the different scales of RTT. The diagonal line represents the variance within each domain. RTT, Reactions to Test Scale; STAI-S, State anxiety scale; STAI-T, Trait anxiety scale.

- RTT was found to be highly reliable for the total scale (Cronbach's $\alpha = 0.90$) as well as for the subscales, except Bodily Symptoms subscale ($\alpha = 0.67$).

Gender and curriculum phase comparisons



Figure 1 and 2. RTT subscales and total scale by gender, age and curriculum phase.

- Gender: Significant differences in Tension ($t(391) = -6.449$; $p < .001$, $d = 0.73$), Worry ($t(391) = -4.516$; $p < .001$, $d = 0.53$) Bodily Symptoms ($t(391) = -3.515$; $p < .001$, $d = 0.42$) subscales and in the total scale ($t(391) = -4.525$; $p < .001$, $d = 0.52$) - female medical students with higher scores than male students.
- Curriculum phase: no significant differences in all RTT subscales.

Conclusions

- Findings support the validity and reliability of the Portuguese RTT 20-item among medical students and confirm the four-factor model (first order model) and the second order factor model.

Take home message

RTT 20-item version proved to be an useful and practical tool to evaluate Test Anxiety among medical students and may improve the understanding of how anxiety relates to performance.

References: (1) Cassidy JC. The influence of cognitive test anxiety across the learning-testing cycle. *Learn Instru.* 2004;14:569-592.. (2) Hahn H, Kropp P, Kirschstein T, Rucker G, Muller-Hilke B. Test anxiety in medical school is unrelated to academic performance but correlates with an effort/reward imbalance. *Plos One.* 2017;12:2-13.

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