Rasch Analysis and Item Reduction of the Chinese Version of the 20-item Toronto Alexithymia Scale (TAS-20-C) for Adolescents

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INTRODUCTION

Alexithymia encompasses four dimensions, namely, a difficulty in identifying and describing feelings, confusion to distinguish between emotional arousals and bodily sensations, a poverty of imagination and fantasy life, and a concrete, reality-based cognitive style.¹ The 20-item Toronto Alexithymia Scale (TAS-20) was designed to assess alexithymia in adult samples.² Both exploratory and confirmatory factor analyses revealed that alexithymia can be best represented as a three-factor model, including (1) difficulty of identifying feelings, (2) difficulty of describing feelings, and (3) externally oriented thinking.³ Given that alexithymia was found to be associated with the functioning of corpus callosum⁴ which develops robustly in adolescents,⁵ the use of TAS-20 on adolescents remained an open question. In light of this, the present study has two aims. First, this study aims to refine the TAS-20 for adolescent populations by using Rasch modelling analyses and the factor structure of the refined measurement of alexithymia will be evaluated by exploratory factor analysis (EFA) (Study 1). Second, this study also aims to examine how far the results of EFA could be extended to Chinese adolescents in different grade levels by utilizing multiple-group confirmatory factor analysis (CFA) (Study 2).

PARTICIPANTS & PROCEDURES

A total of 1294 (from the first to the fifth forms) Hong Kong Chinese adolescents were recruited, comprising the first (n=358), second (n=346), third (n=359) and senior (n=230) formers in this study.

INSTRUMENTS

-The TAS-9-C which consists of 9 items rated on 5-point Likert scale.

STUDY 1

STATISTICAL ANALYSES

Rasch analysis was applied to inform our item selection. Individual item fit was assessed using residual values and differential item functioning (DIF). Throughout this process, the item map was consulted to identify redundant items. The factor structure of the selected items was then examined by EFA using oblique promax rotation. All items should be loaded on its principal component(s) with a loading above the minimum criterion for saliency (r<0.40). The internal consistency (Cronbach’s α) of the entire instrument were assessed.

RESULTS

Rasch analysis of the TAS-20-C indicated that it did not fit the model (total χ²=254.65, df=140, p<0.001; fit residual mean for item (standard deviation)=0.92 (4.18)). Resoring was performed according to threshold ordering.⁷ Items 1, 2, 4, 5, 6, 9, 10, 11, 13, 14, 16, 18 and 19 had significant misfit (fit residual ranging: 3.73 to 9.62). None of the item exhibited DIF by grade levels or latent trait ability x grade levels. Having consulted the item map on distribution of the underlying trait of alexithymia (Fig 1), item 1, 2, 4, 5, 6, 9, 10, 13, 16, 18 and 19 were then removed. The person separation index slightly increased (from 0.78776 to 0.81611), indicating that remaining items (TAS-9-C) retained reasonable measurement variables of TAS-20-C (Fig 2).

Results of EFA on the TAS-9-C yielded a one-factor model accounting 38.23% of the total variance (eigenvalue=3.44; 90% CI of RMSEA: r<0.46). Internal consistency of the scale was good (α=0.79).

CONCLUSIONS

The TAS-9-C is a valid and reliable instrument to be employed among adolescents across different grade levels. Future research on the specific role of alexithymia in explaining presentation of somatic symptoms with regard to both neurological and psychological processes is desirable.

References