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PTI (Psychological Treatment Inventory): Applying the Mixed Rasch Model to the ASS (Attachment Styles Scale)

Marco Giannini, Alessio Gori
University of Florence, Florence, Italy

This study describes a new instrument for evaluating interventions and outcomes using repeated measurements. The PTI (psychological treatment inventory) includes interacting biological, psychological, behavioural, social and environmental factors across various domains central to planning psychological treatment and evaluating its outcome. This study aims to explain the theoretical principles underlying the PTI and verify the dimensionality of the PTI ASS (attachment styles scale). Data from 1,800 individuals were analyzed by the means of WIN-MIRA (Windows-Mixed Item Response Analysis). Item parameters and Person Parameters were analyzed and discussed. Results confirmed that the PTI-ASS has good psychometrics properties and can be adopted for measuring attachment for both research and practice.

Keywords: item response theory, attachment, test development, psychotherapy integration

Introduction

Since the 1970s (Strupp & Hadley, 1977; Waskow, 1975), there has been an increasing need of psychological assessment procedures developed to verify the efficacy and effectiveness of psychotherapeutic interventions. Measures that can be adopted from clinicians of different theoretical orientations and that pay attention to essentials and common constructs of the most psychological treatments. Brief measures with good psychometric properties are able to highlight any changes in the psychological condition during the treatment.

This paper introduces a new instrument designed for the repeated measurement of client status over the course of therapy and at termination, considering the interacting influences of biological, psychological, behavioural, social and environmental factors (biopsychosocial model). The instrument is based philosophically on a form of monism (double aspect monism) that accepts the existence of body-mind. The PTI (psychological treatment inventory) (Giannini & Schuldberg, 2008) was formulated in accordance with recent advances in psychology and psychotherapy research and follows a pluralistic approach to psychotherapy integration (Castonguay & Hill, 2006; Ford & Urban, 1998; Gold & Stricker, 1993; Goldfried, 1980, 1991; Norcross & Goldfried, 2005; Stricker & Gold, 2006; Wachtel, 1977, 2008). By assuming a biopsychosocial model, the new instrument allows the inclusion of diverse behaviours and constructs from a range of theoretical orientations.

The PTI was designed to include items in various domains central to planning psychological treatment and evaluating its outcome. Each construct has been grouped in four areas: (1) validity; (2) resources; (3) clinical; and (4) psychological treatment.

The aim of this study is to describe the theoretical principles of the PTI and verify the psychometric properties of the attachment style scale (cluster included in the psychological treatment area) through the IRT (item response theory).

First of all, this paper presents the PTI's theoretical foundations and then the results of IRT analysis and a brief discussion.

Brief Description of the PTI Clusters

The clusters and the constructs of interest of the PTI have been identified through a carefully and rigorous analysis of the literature (Beutler, Clarkin, & Bongar, 2000; Butcher, 1990; Brooks-Harris, 2008; Castonguay & Hill, 2006; Docherty & Streeter, 1995; Garfield, 1992; Gold & Stricker, 1993; Goldfried, 1980, 1991; Greene, 1994; Hoagwood & Jensen 1996; Ingram, 2006; Lambert, 2004; Lazarus, 1992; Maruish, 2004; Meyer & Handler, 1997; Norcross & Goldfried, 2005; Stricker & Gold, 2006; Wachtel, 1977, 2008; Weinberger, 1995) and thanks to the contribution of clinician of different orientations and psychometricians, which actively participate in this project.

The PTI was designed to include items in various domains central to planning psychological treatment and evaluating its outcome. Each construct has been grouped in four areas:

- (1) Validity;
- (2) Resources. It includes two clusters: psychological resources and quality of life;
- (3) Clinical which includes two clusters (symptomatology and psychological types). Symptomatology is articulated into internalized symptoms scales and externalized symptoms scales;
- (4) Psychological treatment. It is composed of four clusters: (a) attachment styles; (b) predominant defence styles; (c) negative treatment indicators; and (d) psychological mindedness.

The number of items of the scales has been chosen considering the unidimensionality of each scale because of the need to have a brief measure. It was assumed that a number of variables from four to 10 (depending on the construct analyzed) were sufficient to represent each factor on the basis of factor analysis criteria and in relation to the theoretical constructs.

This study aims to evaluate the psychometric properties of the PTI-ASS (psychological treatment inventory-attachment styles scale) using the IRT: here, we apply a mixed Rasch model (Rost, 1990; Rost & von Davier, 1994) to each of the four scale of the PTI-ASS in order to explore their dimensionality.

Method

Participants and Procedures

The models of IRT request a large and heterogeneous sample to make the analysis. So in the present research the sample of 1,800 participants were used (55% of them are men and 45% are women). The mean age of the total sample was 36 years old ($SD = 16.3$). The questionnaire was administered in the North and in the Centre North of Italy.

Measure

The PTI-ASS (Gori et al., 2008) was designed to measure the kind of romantic relationship people invest as well as the correlated behaviours, emotions and thoughts, which could be derived from conscious drives. By evaluating these components, the PTI-ASS assesses the related attachment style from among the categories of secure, preoccupied, avoidant and disorganized (Giannini, Gori, De Sanctis, & Schuldberg, in press). The intent

is to infer the linked attachment style via assessing conscious derives (Giannini et al., in press).

The PTI-ASS is composed of 22 items, with a Likert scale with five points (from 1 = “Not at all” to 5 = “A great deal”) that are intended to assess the related attachment style from among the categories of secure, preoccupied, avoidant and disorganized.

The factor structure, reliability, construct and concurrent validity of the PTI-ASS have been verified in a previous study (Giannini et al., in press).

Data Analysis

Data from 1,800 individuals were analyzed by the means of the WIN-MIRA (Windows-Mixed Item Response Analysis) (von Davier, 2001a).

The mixed Rasch model (Rost, 1990) extends the Rasch model to a discrete mixture model. One of the goals of applying this model is the profile analysis of questionnaire items with ordinal response formats.

WIN-MIRA can be used in fact to estimate model parameters for different polytomous (ordinal) Rasch models as for example the ordinal or partial credit model without any restriction except the normalizing conditions.

For each item, the difficulty parameter and the threshold parameter are calculated: in this case, there are four thresholds because of $J = K-1$ (where K is the number of category response). Besides, the mixed Rasch model is a probabilistic model, so the maximum likelihood can be calculated through the MLE (maximum likelihood estimation) and the WLE (weighted likelihood estimation). CML (conditional maximum likelihood) estimation is used in WIN-MIRA, in order to avoid estimating biased person and item parameters simultaneously. This ensures that consistent item parameters are obtained which can be used to obtain person parameter estimates.

Warm's WLE estimates (Warm, 1989) have, as compared to the MLE estimates, two main advantages: First, their bias is smaller (Warm 1989; Hoijsink & Boomsma, 1995); and Second, they produce reasonable estimates even for the two extreme response patterns, i.e., for the patterns with zero and maximum score. Since the PTI Likert scale is with five points (from 1 = “Not at all” to 5 = “A great deal”), the Likert was rescaled (from 0 = “Not at all” to 4 = “A great deal”) to be used with the software.

Results

The item parameters should decrease from threshold to threshold whenever an ordered response format is assumed. A decreasing easiness of the threshold parameters indicates that every response category is representative for an interval of the individual parameter dimension (von Davier, 2001b).

Regarding the factor secure attachment, all the thresholds are ordered except for items 5 and 13. This means that, assuming one class of respondents, more people tend to respond to these items “A little” instead of “Not at all”. In other words, it is easier to respond “A little” instead “Not at all”. Since the scale was submitted to a normal population as expected, there are some non-ordered response formats also for preoccupied and avoidant factors and reversal order for the factor disorganized. In particular, for preoccupied factor, people tend to respond more “Much” instead “Somewhat” to the items 4, 7 and 20, while regarding the avoidant factor just the item 14 presents a small reversal between threshold 1 and 2. Conversely, in the disorganized factor, the thresholds are reversed. As for example, it is easier to respond “Not at all” at the item 22 (I am being hardly persecuted by my partner) in a normal population while is very difficult to endorse “A great deal”.

The item parameters of the PTI-ASS four scales obtained with WIN-MIRA are showed in Figure 1.

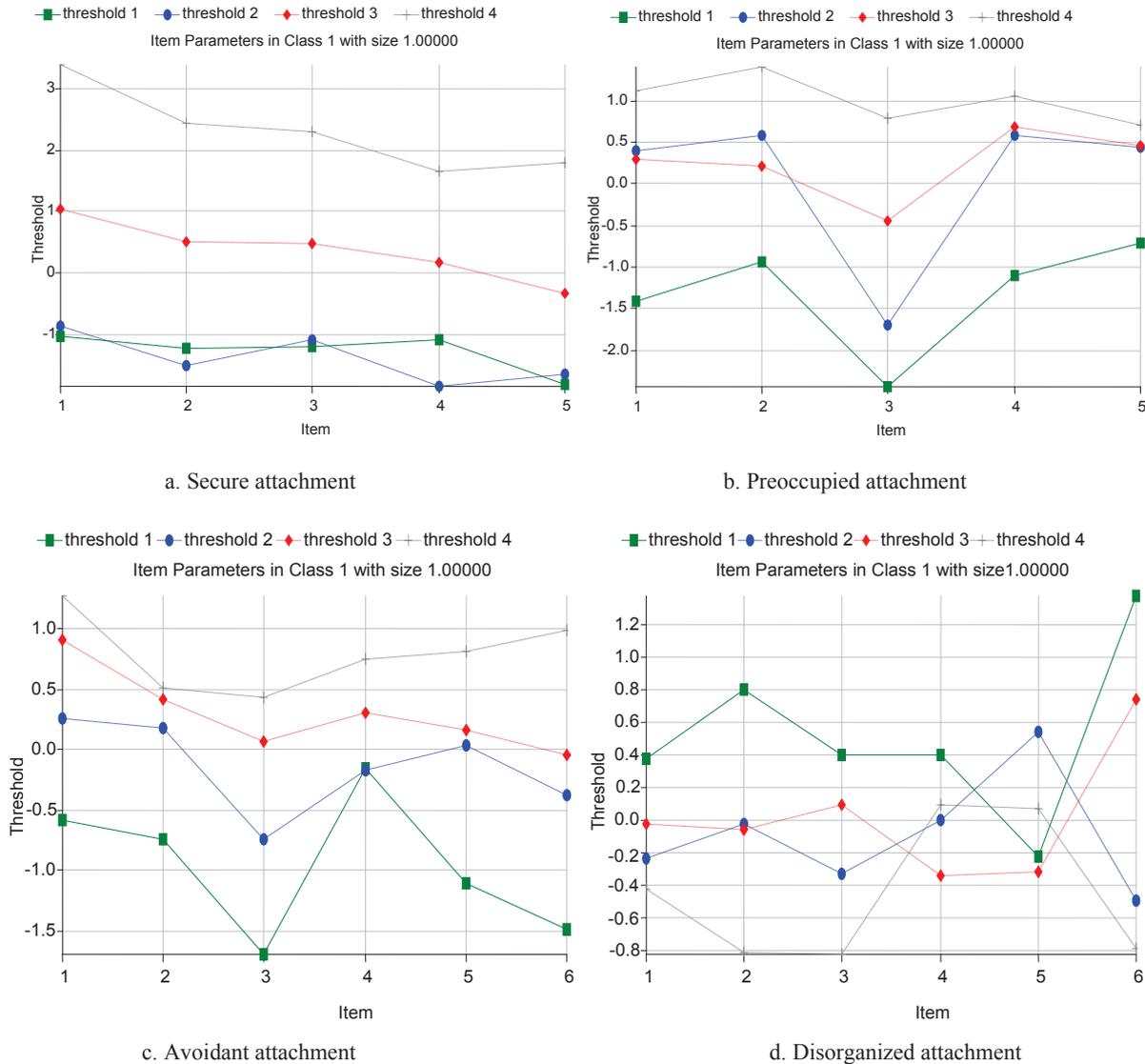


Figure 1. Item parameters for the PTI-ASS four factors (secure, preoccupied, avoidant and disorganized).

For Person Parameters, both MLE and Bayes WLE are shown. The WLE should usually be preferred as they are less biased and give reasonable estimates even for the extreme score groups (von Davier, 1995). The Person Parameter graph shows the absolute raw score frequencies with a simultaneous person parameter plot for the maximum likelihood and the warm Person Parameter. Figure 2, in particular, shows the frequency distributions of the raw scores for the total sample in the four factors. Most participants for what concerns the secure factor tended to have highest scores ranging from 11 to 16 while for preoccupied from two to nine (both factors out of 20 points) (see Figure 2). For avoidant and disorganized factors, the highest scores are very low, ranging from 0 to 5 (avoidant factor) and from 0 to 3 (disorganized factor) both factors out of 24 points showing a marked positive skewness. The estimated WLE is ranging from -3.616 to 4.913 (secure) from -3.882 to 3.341 (preoccupied) from -3.603 to 3.308 (avoidant) and from -1.907 to 1.962 (disorganized).

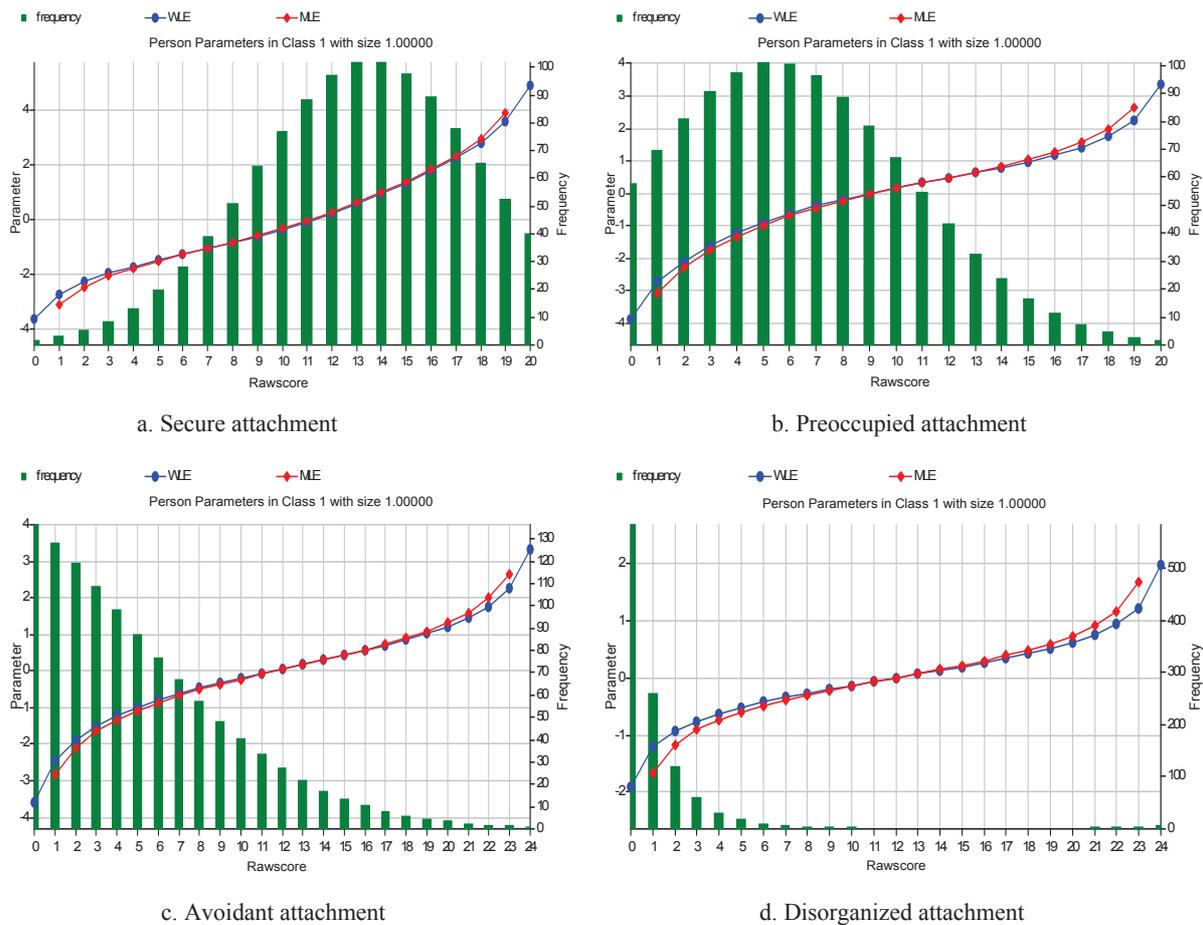


Figure 2. Person parameters for the PTI-ASS four factors (secure, preoccupied, avoidant and disorganized).

Conclusions

This study describes a new instrument for evaluating interventions and outcomes using repeated measurements. The PTI (Gori et al., 2008) includes interacting biological, psychological, behavioural, social and environmental factors across various treatment planning and outcome evaluation domains. It follows a pluralistic psychotherapy integration approach encompassing diverse constructs and theoretical orientations.

In the present study we analyzed the psychometrics properties of the PTI-ASS (Gori et al., 2008) using the IRT to explore the dimensionality of each of the four scales of the PTI-ASS. The PTI-ASS, in particular, was designed to measure the kind of romantic relationship people invest as well as the correlated behaviours, emotions and thoughts, which could be derived from conscious drives.

In a previous research, the PTI-ASS showed a clear and clinically (and theoretically relevant) factor structure with four independent and robust dimensions conceptualized as secure, preoccupied, avoidant and disorganized (Giannini et al., in press).

Good results are also obtained with IRT analysis here presented. A mixed Rasch model was used, in the present study, on a normal population: Analyzing the item parameters, it has been found that all the thresholds are positively ordered with just some reversal. The disorganized factor that basically measures difficulty with intimacy has the

reverse order. In general as expected, most of the respondents chose the first two categories (“Not at all” and “A little”), because there is probably a little percentage of the normal population with a disorganized attachment. Person parameters showed a marked positive skewness of the raw scores for avoidant and disorganized factors.

These results suggest that this new, brief and easily administered and scored instrument for assessing attachment styles in adults has good psychometric properties. IRT analysis confirmed the unidimensionality of each scale. Thanks to these properties, the PTI-ASS can be adopted usefully in both research and practice.

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