The Father/Mother Attachment Questionnaire (FMAQ):

Factor structure invariance across Portuguese and German adolescents

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ABSTRACT

The present study tests factor structure invariance of the Father/Mother Attachment Questionnaire across a Portuguese sample (N = 280) and a German sample (N = 340) of late adolescents (16 to 19 aged). We conducted a multiple group analysis based on the analysis of mean and covariance structures (MACS) to test invariance at three levels: configural, metric and scalar. The results provided evidence for the invariance of the original three-factor structure of the questionnaire across both samples at the configural and metric levels. Internal consistency for all scales across samples is equal or higher than .80.

FATHER/MOTHER ATTACHMENT QUESTIONNAIRE

The Father/Mother Attachment Questionnaire (Matos & Costa, 2001, 2004) is a 30-item self-report measure developed in Portugal, and designed to assess representations of adolescents and young adults about their relationships with parents, according to Bowlby and Ainsworth attachment theory (Ainsworth, 1989; Bowlby, 1973, 1980), and Bartholomew's prototypical model of attachment (Bartholomew & Horowitz, 1991). The questionnaire is organized along three main subscales: *Quality of Emotional Bond* (QEB; 10 items) assesses the experience of an emotional close and supportive relationship with parents, *Inhibition of Exploration and Individuality* (IEI; 10 items) assesses the perception that parents are intrusive and inhibiting of psychological autonomy and differentiation, and *Separation Anxiety* (SA, 10 items) assesses fears of parental loss or abandonment.

Participants respond according to a 6-point scale ranging from 1 (completely disagree) to 6 (completely agree) separately for mother and father relationships. Since its original development, the questionnaire has been used in several independent samples, and evidence for reliability and construct validity has been gathered (Gouveia & Matos, in press).

Translation to German

A first translated version made by the second author was revised by a bilingual Portuguese-German translator to guaranty linguistic and cultural equivalence. The second version was then submitted to an expert in Family and Developmental Psychology, to examine not only the semantic equivalence but also the psychological equivalence. The final version *(Fragebogen zur Bindung an den Vater und die Mutter*; Spill & Matos, 2007) was then administered to a small group of participants, who were demographically similar to the sample targeted in this study. In this pilot test participants were interviewed regarding the adequacy and clarity of the instructions, the format of the questionnaire and the comprehension of the items.

METHOD

Participants

Portuguese Sample: 280 adolescents, aged 16 – 20 years old (M = 17.74; SD = 1.10), 56.8% male and 43.2% female, school grade between 11th to 12th and the majority came from intact families (78%).

German Sample: 340 adolescents, aged 16 – 20 years old (M = 17.63; SD = .81), 40.0% male and 60.0% female, school grade between 11th to 12th and the majority came from intact families (74%).

Procedure

Data from German participants were collected in 5 secondary schools from three different Länder (*Baden-Württemberg*, *Niedersachsen*, *Rheinland-Pfalz*). Data from Portuguese participants came from 3 secondary schools from the city of Porto. The students responded to the questionnaires in the class and group setting, under the supervision of the second author. They were previously informed about the general objectives of the larger study, in which the present study is included and were asked for voluntary participation. Confidentiality and anonymity were guaranteed. Participants were not offered any incentives for participation, such as extra course credit or cash compensation, since the use of such incentives is not a usual practice of survey research in Portugal.

Model Fit Evaluation

For testing the **factor structure** of the questionnaire, **confirmatory factor analysis** (CFA) was performed using *EQS 6.1* (Bentler, 2005). The models tested were estimated using *maximum likelihood* estimation. For CFA model fit was assessed through a number of indices: (1) chi-square (χ^2); (2) ratio of chi-square to the degrees of freedom (χ^2/df); (3) Standardized Root Mean Square Residual (SRMR); (4) Root Mean Square Error of Approximation (RMSEA); and (5) Comparative Fit Index (CFI). For determining adequate fit: $\chi^2/df < 3.0$ (Kline, 1998), CFI > .95, SRMR < .08, and RMSEA of < .06 (Hu & Bentler, 1999). For the RMSEA, other cutoff values are also suggested: <.05 good fit, .05–.08 acceptable fit, .08–.10 mediocre fit and >.10 poor fit (Browne & Cudeck, 1993; Byrne, 2006; MacCallum, Browne, & Sugawara, 1996).

For **measurement invariance** (MI) we conducted a **multiple group analysis**. We tested MI based on the analysis of **mean and covariance structures (MACS)** that encompassed a series of hierarchically ordered steps that began with the establishment of a baseline model for each sample, followed by tests for increasingly more stringent levels of constrained parameters equivalence: (1) configural invariance; (2) metric invariance; and (3) scalar invariance. Cheung and Rensvold (2002) and Byrne (2006) recommended three criteria for evidence of measurement invariance: (1) adequate fit indices for the initial baseline model for each group; (2) the multigroup model should exhibit an adequate fit to the data; and (3) ΔCFI < .01 and ΔMcDonald Fit Index (Mc) < .02. More recently Meade et al. (2008) suggested a more stringent cutoff values ΔCFI < .002 and ΔMc < .0057 (for 3 factors and 30 items).

RESULTS

Inter-Scale Correlations

As shown in Table 1, we observed positive correlations between QEB and SA across mother and father versions and across country samples, negative correlations between QEB and IEI, and non significant correlations between IEI and SA (the exception was Portuguese mother version).

Table 1 – Descriptive Statistics, Inter-Scale Correlations and Cronbach's Alphas

	Portugal			Germany		
	IEI	QEB	SA	IEI	QEB	SA
Father						
Mean	2.93	4.79	3.32	2.68	4.42	2.51
SD	.87	1.04	.93	.81	1.01	.76
IEI (*r*)		-.269**	-.023		-.386**	-.058
QEB (*r*)			.665**			.559**
α	.80	.94	.84	.81	.93	.83
Mother						
Mean	3.01	5.01	3.49	2.87	4.63	2.62
SD	.91	.85	.88	.85	.86	.77
IEI (*r*)		-.408**	-.147*		-.450**	-.025
QEB (*r*)			.618**			.524**
α	.83	.91	.82	.84	.91	.83

r – Pearson Correlation; *p < .05; ** *p* < .01; α - Cronbach's alpha; IEI – Inhibition of Exploration and Individuality; QEB – Quality of Emotional Bond; SA – Separation Anxiety.

Reliability

The three scales showed adequate reliabilities ranging from .80 to .94 in both samples and for both parents (see Table 1). QEB presented the highest value (α > .90).

Additionally we tested if there was a statistical difference in the alpha reliabilities for each scale between the Portuguese and German samples. To perform this analysis we used *AlphaTest 1.0 for Windows* (Lautenschlager & Meade, 2008). No statistical differences were observed for IEI_{father} $\chi^2(1) = .153$, *p* > .05; QEB_{father} $\chi^2(1) = 1.088$, *p* > .05, SA_{father} $\chi^2(1) = .539$, *p* > .05, IEI_{mother} $\chi^2(1) = .245$, *p* > .05, QEB_{mother} $\chi^2(1) = .187$, *p* > .05 and SA_{mother} $\chi^2(1) = .624$, *p* > .05.

Confirmatory Factor Analyses

For the CFA and MI we used the parceling approach of the items of FMAQ suggested by Russell, Kahn, Spoth and Altmaier (1998). We ranked ordered items on the basis of the magnitude of the corrected item-total correlations and then successively assigned pairs of the highest, medium and lowest correlating items to each parcel. Each FMAQ dimension (IEI, QEB and SA) has 3 parcels (2 parcels with 3 items per parcel and one parcel with 4 items). As shown in Table 2, all the four models in study (father and mother versions of FMAQ across Portuguese and German samples) showed adequate model fits. These four models are determined to be the baseline models for measurement invariance analysis.

Table 2 – Confirmatory Factor Analyses

	χ^2	χ^2/df	CFI	SRMR	RMSEA (90% CI)
FMAQ Portuguese Father	$\chi^2 (24) = 44.234$ $p < .05$	1.84	.986	.052	.057 (.029 – .083)
FMAQ Portuguese Mother	$\chi^2 (24) = 59.178$ $p < .001$	2.46	.977	.055	.073 (.050 – .097)
FMAQ German Father	$\chi^2 (24) = 64.299$ $p < .001$	2.68	.976	.051	.072 (.051 – .093)
FMAQ German Mother	$\chi^2 (24) = 69.590$ $p < .001$	2.90	.972	.040	.075 (.055 – .096)

Measurement Invariance

Figure 1 shows the diagram of the baseline model for the measurement invariance using MACS strategy and Table 3 presents a summary of goodness-of-fit statistics.

Configural and metric invariance for **relationship with father version** showed adequate models fit, while for scalar invariance a more modestly model fit was found. When we examined the probability values associated with the χ^2 univariate increment information provided by the Lagrange Multiplier Test (LMTest) for each parameter constraint, no noninvariant parameters were found in the metric invariance. However, eight of nine intercepts parameters were noninvariant in the scalar invariance.

For **relationship with mother version** configural and metric invariance showed adequate models fit. However when we examined the information provided by the LMTest for each parameter constraint two noninvariant factor loadings were observed (V_{SA2}, F_3 and V_{IEI2}, F_1). Invoking the condition of partial measurement invariance (Byrne, 2006; Byrne, Shavelson, & Muthen, 1989; Byrne & van de Vijver, 2010) we followed to the scalar invariance, where these two noninvariant parameters were allowed to be freely estimated in each group

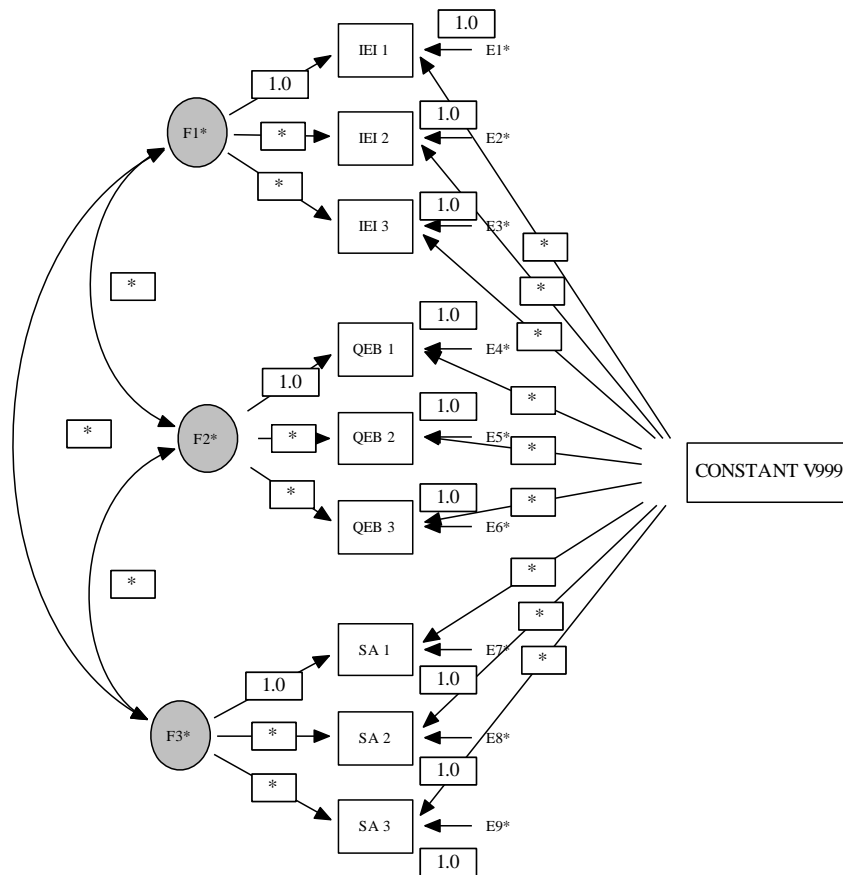(no equality constraint was imposed) and LMTest revealed additionally seven of nine noninvariant intercept parameters.

Figure 1 – Diagram of MI based on MACS

Table 3 – Measurement Invariance Analysis

	CFI	SRMR	RMSEA	Mc	χ^2	df	$\Delta\chi^2$	Δdf	ΔCFI	ΔMc
FMAQ Father										
Configural	.981	.052	.046	.950	108.533	48				
Metric	.980	.056	.044	.948	116.334	54	7.801	6	.001	.002
Scalar	.975	.114	.088	.927	346.329	63	237.796	15	.006	.023
FMAQ Mother										
Configural	.975	.048	.052	.936	128.768	48				
Metric	.969	.064	.055	.923	152.170	54	23.402	6	.006	.013
Scalar*	.970	.118	.088	.916	347.605	61	218.837	13	.005	.020

Note: $\Delta\chi^2$, Δdf, ΔCFI and ΔMc were the difference between each alternative and the configural model; * partial measurement invariance: two noninvariant factor loadings were not constrained.

DISCUSSION

In both samples (Portuguese and German) and for both parents (father and mother) the FMAQ showed adequate reliability and no statistical differences in the alpha reliabilities for each scale (IEI, QEB and SA) were found, indicating that the internal consistencies of the scales are similar for these two country samples.

The goodness-of-fit indices of CFA for each parent and country also showed that the factor structures of FMAQ were adequate. In the MI, the configural invariance between Portuguese and German samples was established for father and mother versions, that is, both groups associate the same subsets of items with the same latent constructs. The factor structure is similar and this configural invariance model serves as the baseline against which all subsequent tests for equivalence were compared. The metric invariance was established for father and no noninvariant parameters were found, indicating that all factor loadings are equal across groups, however for mother two noninvariant factor loadings were observed, this may mean that the items of these two parcels (parcel SA2: items 9, 15, 18; and parcel IEI2: items 4, 10, 13) were differentially interpreted by Portuguese and German adolescents. For scalar invariance the majority of the intercepts were noninvariant, indicating that parcels means are not similar across groups.

In general, the results showed adequate reliability and factor structure of FMAQ and provided evidence for the measurement invariance (configural and metric) of the original three-factor structure of the questionnaire across Portuguese and German samples.

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