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Confirmatory Factor Analysis of the QRI Father's Version in a Portuguese sample of adolescents

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Abstract

Studies about the specific relationships' quality with the father are scarce. The quality of Relationships Inventory – QRI proposed by Pierce, Sarason and Sarason (1991), evaluates three important dimensions of relationships perceived by the adolescent: Support, Depth and Conflict. The present research aimed to test the structure of QRI father's version (Neves & Pinheiro, 2006; Matos, Pinheiro & Marques, 2013 – Portuguese version), with a Confirmatory Factor Analysis and to study the relations between the QRI dimensions. Sample comprised 312 adolescents, 171 females and 141 males, aged between 12 and 17 ($M = 13.77$, $DP = 1.16$). The three-factor solution proposed by Pierce et al. (1991) was confirmed in this Portuguese adolescent sample. High positive associations between Support and Depth subscales, ($r = .76$) and low negative associations between these subscales and the Conflict subscale ($r = -.13$ and $r = -.09$) were found in the father's version of QRI. Support and Depth, in the relationship with the father, seem to be especially related to each other, presenting negative associations with Conflict. The results suggest that this instrument, with a three factor structure, can be used in future researches namely to study preventive interventions with adolescents and their families designed to diminish vulnerability to psychopathology, namely depression.

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1. Introduction

Over the last few years, social support has proved to be one of the most important psychosocial factors that affect mental health (Nakano, Sugiura, Aoki, Hori, Oshima, Kitamura, et al., 2002).

According to Sarason, Levine, Basham and Sarason (1993), social support is defined as the process involving transactions with significant others that facilitate coping with stress and other life burdens and tasks. The perception of social support, defined as the expectations that people have about assistance and emotional support from others (Sarason, Sarason & Pierce, 1990), is being considered an essential function of interpersonal relationships.

Literature has found that social support is negatively correlated with symptoms of physical or mental illness and the vast majority of researchers defends that social support tends to increase self-esteem, positive mood and optimistic view of life, and decrease feelings of stress, loneliness and failure (Cohen & Wills, 1985; Cohen, 1988; Baldwin, 1992). Perceived social support has proved to be a moderating factor in the relation between disruptive or adverse situations and physical and emotional well-being (Abbot, 2009; Neves, 2006).

Although, previous studies found that social support is frequently associated with better quality of life and less psychological distress (Bloom & Spiegel, 1984; Claudino, Cordeiro & Arriaga, 2006; Northouse, 1988; Heinonen et al., 2001; Kornblith et al., 2001), they focused on general perceived support in relation to the whole group of people around each individual and studies that approach social support from a particular individual relationship (individual-specific perceptions) are scarce.

Based on the interactional-cognitive model of social support, specifically in interpersonal context of social support, Pierce, Sarason and Sarason (1991) developed the Quality of Relationships Inventory (QRI). This instrument assesses perceptions of social support about specific relationships, consisting of people's expectations about the availability of support (Pierce, 1994; Pierce et al., 1991). Besides measuring perceived social support within the context of a specific relationship, the QRI assesses two others pertinent features to social support processes, that is, conflict and depth (Pierce, 1994; Pierce et al., 1991).

The psychometric properties of the QRI have been studied and results indicated that the QRI has good validity (e.g., discriminant, predictive), and temporal stability (e.g., Cousson-Gélie, Chalvron, Zozaya & Lafaye, 2013; Nakano et al., 2002; Pierce, 1994; Pierce et al., 1991; Verhofstadt, Buysse, Rosseel & Peene, 2006). Pierce et al. (1991) investigated the factor structure of the QRI in a sample of undergraduates who completed the QRI for several close relationships (e.g., mother, father, and friend). A principal factors analysis, using maximum likelihood estimation with oblique rotation, revealed the presence of three separate but correlated dimensions of relationships that accounted for 48.9% of the total variance (seven items represented the support dimension, twelve items defined the conflict dimension, and six items loaded strongly on the depth dimension).

Nakano et al. (2002) attempted to replicate this factor structure using principal factor analysis with oblique rotation in a sample of 187 Japanese women. They obtained a two-factor solution: a support factor consisting of 14 items and a conflict factor composed by 11 items. Verhofstadt et al. (2006), in a sample of 286 Belgian couples found better results for the three-factor solution. The German version of the QRI (Reiner, Beutel, Skaletz, Brahle & Richter, 2012), in a sample of 1494 participants, confirmed the existence of three factors: support, conflict and depth. In 2013, Cousson-Gélie, Chalvron, Zozaya & Lafaye, in a sample of 388 French cancer patients, with an exploratory factor analysis, identified a factor structure with three principal dimensions: support (five items), depth (six items), and conflict (nine items).

In 2006, Neves and Pinheiro adapted and validated the Portuguese version of the QRI, called "Inventário da Qualidade das Relações Interpessoais" (IQRI), for the specific relationships with the mother, father, friend and boyfriend or girlfriend in a sample of colleges students ($n = 255$). The dimensionality of the instrument was studied, through exploratory factor analysis, and the factor structure of Pierce et al. (1991) was replicated. For the specific relationship with the father, it was found that the instrument consisted of 24 items (due to the elimination of item 2- How often do you need to work hard to avoid conflict with this person?). These items were distributed in three dimensions: 7 items for Support; 11 items for Conflict; and 6 items for Depth. According to Neves (2006), the results obtained proved that IQRI is a valid and reliable measure of the quality of interpersonal relationships, in accordance with interactional-cognitive model of Pierce et al. (1991).

In the Portuguese population, with a sample of adolescents ($n=164$), Matos, Pinheiro and Marques (2013a,b) conducted an exploratory factor analysis of IQRI, which found that the mother/father versions were composed of 24 items, and assessed two dimensions Support / Depth and Conflict.

The IQRI has some features that make it suitable for use in research and in clinical setting and can be used to study a broad range of close relationships, from the romantic partners to family members, co-workers, and peers. Additionally, the IQRI is easy to administer and score (Verhofstadt, et al., 2006).

Although the IQRI was been considered a promise instrument, some important questions about it still remain. Namely, the available research on the underlying structure of the IQRI has revealed somewhat different results. Although, this outcome may be, to a certain extent, a consequence of using different samples, a further examination of the factor structure of the IQRI is still needed. Therefore, the major aim of the current study was to further investigate the factor structure of the IQRI by means of confirmatory factor analysis (CFA) in a sample of Portuguese adolescents.

2. Purpose of the Study

In order to explore the interpersonal context of social support in a sample of Portuguese adolescents, the present study aims to confirm the factor structure for the Portuguese adaptation of the Inventory of Interpersonal Relations Quality – father’s version (Quality of Relationships Inventory – QRI, Pierce et al., 1991). Additionally it was intended to explore the associations between the three IQRI subscales.

3. Research Methods

The sample used in this study was composed by adolescents from public schools. These participants took part of a wider research project.[†]

To test the three-factor model of QRI proposed by Pierce et al. (1991), a sample with 312 adolescents, 171 females e 141 males, aged between 12 and 17 ($M= 13.77$, $DP= 1.16$) was used.

3.1. Measures

Quality of Relationships Inventory (QRI; Pierce et al., 1991; Portuguese version: Neves & Pinheiro, 2006).

The QRI is a questionnaire consisting of 25 items, which asks about specific relationships with a particular individual. Pierce et al. (1991) verified that QRI was composed of three factors: Support (7 items), Depth (6 items) and Conflict (12 items). Support subscale assesses the perceived availability of social support from the specific relationships. Depth subscale assesses the extent to which the relationship is perceived as positive and important. Conflict subscale assesses the extent to which the relationships are conflictual or ambivalent. Each item is assessed on a 4-point Likert scale ranging from 1 (not at all) to 4 (very much).

Pierce et al. (1991) used a principal factor analysis (direct oblimin rotation) and obtained a three-factor solution. In terms of internal consistency of the three factors, they obtained an alpha of .88 for support and conflict and .86 for depth subscale on father’s version. The Portuguese version (Neves, 2006) comprises 24 items and factor analysis revealed a tri-dimensional structure. Good reliability was found on father’s version ($\alpha= .91$ for support and .89 for conflict and depth subscales). Also in the Portuguese population, with a sample of adolescents, Matos, Pinheiro and

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Marques (2013a), found a good internal consistency, on father's version, for the two dimensions Support / Depth ($\alpha = .94$) and Conflict ($\alpha = .88$).

3.2. Procedure

Students and parents were informed about the nature and purpose of the study, as well as the voluntary nature of their participation, the confidentiality of data collected and their use only for research purposes. Students and parents also signed the informed consent to authorize participation in the study.

3.3. Statistical Analyses

A confirmatory factor analysis of the three-factor structure of IQRI father's version was performed with AMOS software, version 20. In order to evaluate the best goodness-of-fit of the IQRI model, the following criteria were considered: $\chi^2/df < 5$, GFI $> .90$, AGFI $> .90$, CFI $> .95$, TLI $> .90$ and RMSEA $< .06$ (Kline, 2005; Marôco, 2010a).

Regarding the Chi Square Test, it was considered $\chi^2/df = 1$ as perfect, χ^2/df less than 2 as good, acceptable if less than 5 and unacceptable with 5 or more (this value is influenced by sample size). Concerning RMSEA, values above 0.05 indicated good fit and values of 0.1 or more are considered to indicate poor fit (Kline, 2005; Marôco, 2010a). Model modification was made taking into account the Lagrange Multiplier (LM) test, in which $LM > 11$ ($p < 0.01$) indicate that modification indexes are not adequate. Factorial validity was assessed by individual reliability of the items and their standardized factor weights (acceptable values, respectively: $r^2 \geq 0.25$ and $\lambda \geq 0.5$).

Correlations between subscales of IQRI father's version were calculated with Pearson's correlation coefficient. For all statistical tests, p value less than 0.05 were considered indicative of significant differences. All data analyses were performed using the statistical software package SPSS, version 20.0 for Windows (SPSS Inc., Chicago, IL.).

4. Findings

4.1. Confirmatory Factor Analysis

The assumptions required for CFA were tested. The normality of the sample was tested by analyzing the coefficients of skewness (sk) and kurtosis (ku). According to Kline (1998), the symmetry coefficient higher than 3 and kurtosis coefficient upper 10 show a significant deviation from normal distribution. According to these criteria there are no values indicating violation of normality. It was verified the existence of outliers through the square Mahalanobis distance (d^2) and were removed 11 multivariate outliers that had $p1$ and $p2 < 0.05$ (Marôco, 2010a).

In a first model, that included 25 items of the structure found by Pierce et al (1991), factor weights and individual reliability of the items were analyzed. Some items had not an acceptable factor weight, such as item 24 ($\lambda = .473$), 25 ($\lambda = .411$) and 2 ($\lambda = .043$). The same thing happened with the individual reliability of items 24 ($r^2 = .224$), 25 ($r^2 = .169$) and 2 ($r^2 = .002$). According to the modification indices (MI), we found that these items (2, 14, 19, 24 and 25) had $LM > 11$ ($p < 0.01$), suggesting items cross-loaded on depth and support factors. On the other hand, Pierce et al. (1991) verified that these items belonged to conflict factor. This fact could indicate that those items are not adequate measures of conflict, so, items 2, 24 and 25 were removed.

In a second model, factorial validity and individual reliability proved to be appropriate, since all items had standardized weights $> .05$ and squared weights $> .25$. Concerning the MI, items 14 and 19 were cross-loaded on support and depth factors. In the tri-factorial model of Pierce et al. (1991) these items belonged to conflict factor. Taking into account theoretical considerations and analyzing the contents of items (item 14 – “How critical of you is this person?”, and item 19 – “How much would you like this person to change?”), we concluded that these items were not directly related to issues of conflict. Thus, items 14 and 19 were removed.

The third model revealed the best goodness-of-fit (the data can be observed in Table 1- Model 3 and in Fig.1).

The analysis of the differences between the Chi-Squares of successive models supports our decision to remove the items. The differences in quality of fit between Model 1 [χ^2 (272) = 690.785] and Model 2 [χ^2 (206) = 460.721] proved to be significant [$\Delta\chi^2$ (66) = 230.067, $p < .001$]. Model 2 displayed lower values of AIC (Akaike Information Criterion), BCC (Browne-Cudeck Criterion) and MECVI (Modified Expected Cross-Validation Index) (598.721, 610.179 and 2034 respectively), when compared to Model 1 (846.785, 861. 588 and 2.872 respectively). The difference in the quality of fit between Model 2 [χ^2 (206) = 460. 721] and Model 3 [χ^2 (167) = 364. 106] also proved to be significant [$\Delta\chi^2$ (39) = 96.615; $p < .001$]. Model 3 had considerably smaller values of AIC, BCC and MECVI (490.106, 499.590 and 1.665 respectively), than the Model 2 (598.721, 610.179 and 2.034 respectively).

Table 1. Goodness-of-Fit Indices for the Different Models – IQRI father’s version (n=301)

	X ² /df	TLI	CFI	PNFI	PCFI	RMSEA
Model 1	2.540***	.895	.905	.774	.821	.072
Model 2	2.237***	.931	.931	.798	.837	.064
Model 3	2.180***	.941	.948	.799	.833	.063

Note: TLI: Tucker-Lewis Index; CFI: Comparative Fit Index; PNFI: Parsimony-adjusted Normed Fit Index; PCFI: Parsimony-adjusted Comparative Fit Index; RMSEA: Root Mean Square of Approximation.

* $p < .05$; ** $p < .01$; *** $p < .001$

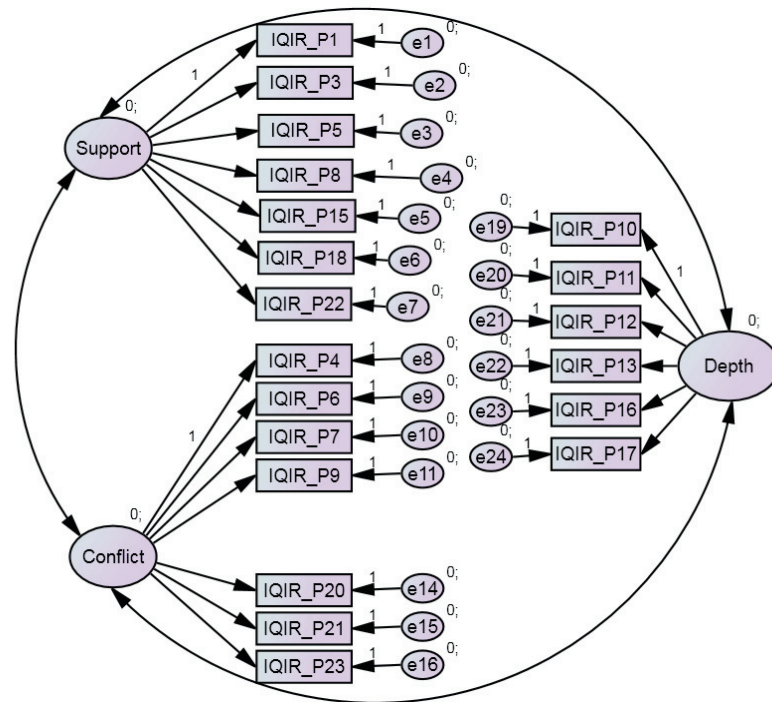


Fig.1- Model 3 for father’s version of IQRI - Quality of Relationships Inventory – Portuguese version

4.2. Correlations between subscales

To calculate the correlations between subscales of IQRI was used a larger sample of 515 adolescents, 48.2% (n=248) males and 51.8% (n=267) females. The age range was from 12 to 17 years and the mean age was 13.78 (SD=1.074). Boy and girls didn't differ significantly in age ($t=.215$; $p>.05$).

Low negative correlations were found between support and conflict subscales ($r = -.13$; $p\leq.01$), as well as between depth and conflict ($r = -.09$; $p\leq.01$) subscales. Support and depth, showed a positive relationship with high magnitude ($r = .76$; $p\leq.01$).

5. Discussion

The first aim of the current research was to analyze which model best represented the underlying structure of the IQRI. The CFA results revealed that a three-factor model (Pierce et al., 1991) provided an adequate fit to the data. Other studies (Verhofstadt et al., 2006; Reiner et al., 2012 & Cousson-Gélie et al., 2013) have also confirmed the three-factor structure proposed by Pierce et al. (1991). Although, Nakano et al. (2002) and Matos et al. (2013a) found a two-factor structure.

The results presented a IQRI father's version composed by 20 items, divided into three factors: support (items 1, 3, 5, 8, 15, 18 and 22), conflict (items 4, 6, 7, 9, 20, 21 and 23) and depth (items 10, 11, 12, 13, 16 and 17).

Items 2, 7, 9, 14, 19, 24 and 25, belonged to the conflict factor in analysis of Pierce et al. (1991) and Neves (2006). However, they were eliminated for the paternal relationship. This seems to indicate that the adolescents don't perceive the relationship with the father as a special source of conflict. On the contrary, the adolescents seem to associate the content of these items with issues of control and father's influence in their life.

Usually adolescents are not much available to answer long assessment questionnaires, often revealing tiredness and lack of accuracy in filling instruments and that can have an impact on reliability of the questionnaire. Moreover, in the case of IQRI, there are several versions for different significant figures, but with the same set of items, so, the adolescents has to answer one for each relationships in question. Therefore it was used a more conservative criterion proposed by Marôco (2010), accepting only those items that they factor weights higher than 0.5, in other words, that had 25% of the variance in common with the respective factor. In addition, we also had regard to the content of the items in the decision of their exclusion. The fact that the Chi-Square had decreased between the models and the differences between the values of chi-square between the models were significant revealed that the exclusion of items in each model was significant to improve its quality. We also found that quality indices of fit improved with the removal of items.

Although perceptions of support, conflict and depth were found to be empirically differentiable latent constructs, providing different information they are substantially correlated. Taking into account previous studies (Pierce et al., 1991; Neves, 2006 & Matos et al., 2013),-our results indicate that when the adolescents perceived their relationship with the father as supportive and important, they had less tendency to perceive it as a source of conflict The perceived importance of a relationship was also positively associated with reports of a supportive relationship.

The present research has an important limitation in what concerns the sample in which the factor structure was studied. We used a sample of predominantly well-functioning adolescents, therefore, it is important, in future studies, to determine whether the pattern of results found in the current study can be replicated in more diversified samples. Future studies also should test the validity of the structure and the use of the scale in clinical populations. We consider relevant also, to extend the study to other versions of IQRI, already studied in other age groups, to samples of adolescents.

The present study is based on the assumption that perceptions of support in a particular relationship are related to perceptions of conflict and depth in that relationship (Pierce et al., 1991). The current findings reinforce the claim of previous social support researchers (Pierce, 1994) that it is important to study relationships not only as sources of help and assistance but to focus also on other relationship features (e.g., conflict) that influence social support processes. These data point to the usefulness of the IQRI in future research on social support in the context of family

relationships and provide new empirical evidence for the factorial validity of the IQRI, in adolescents, confirming the three-factor structure originally proposed by Pierce et al. (1991).

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