Original article (short paper)

Fear of Failure in Sport: A Portuguese Cross-cultural Adaptation

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Abstract— The Performance Failure Appraisal Inventory (PFAI) is a multidimensional measure of threat appraisals associated with one's fear of failure. Whilst emerging research has supported the validity and reliability of the PFAI with North American and British sport participants, its psychometric proprieties remain untested within Portuguese samples. This study examined the psychometric proprieties of the PFAI with a sample of 556 Portuguese athletes. A confirmatory factor analysis was employed to test whether the proposed multi-factorial structure of the PFAI fits well the Portuguese data. All factors displayed good internal consistency, convergent validity, and discriminant validity. Multi-group analysis revealed cross-validity and the models' invariance. The correlations between fear of failure and sport anxiety measures revealed evidence of its concurrent validity. The PFAI appears to be a psychometrically sound measure and a valid and reliable tool for assessing fear of failure in Portuguese sport contexts.

Keywords*:* fear of failure, cross-cultural validation, confirmatory factor analysis

Introduction

Sport represents an important achievement domain and the existence of pressure to achieve top sporting performances can produce an increase in fear of failure among athletes[1].

In sport, limited research has shown fear of failure to be associated with cases of burnout[2], youth sport drop out, barriers to sport participation[3], athletes' drug abuse[4], and athletic stress[5].

Conroy, Willow, and Metzler[6] proposed a multidimensional model of fear of failure (The Performance Failure Appraisal Inventory–PFAI), grounded in Lazarus's cognitive-motivational-relational theory of emotions and consistent with other multidimensional models of fear of failure[7]. For the PFAI authors, one of the greatest advantages of this instrument over alternatives fear of failure measures[8–11] may be its superior substantive foundation.

The Performance Failure Appraisal Inventory was developed by Conroy[6,12] to measure individuals' beliefs in specific aversive consequences of failing. This inventory comprises 25 items that measure five dimensions of threat appraisals associated with fear of failure: (1) fear of shame and embarrassment; (2) fear of devaluing one's self-estimate; (3) fear of having an uncertain future; (4) fear of important others losing interest; and (5) fear of upsetting important others.

The PFAI is the first fear of failure measure developed from the meta-theory of emotions and it examines fear of failure as a function of person-environment interaction (rather than a state or trait) and acknowledges the individual nature of perceptions of failure, rather than assuming it to be the same for all performers[13].

Conroy[6] views fear of failure as the dispositional predisposition to appraise threat, to the achievement of personally meaningful goals, when one fails. Individuals with a higher fear of failure have learnt to associate failure with aversive consequences and typically perceive failure in evaluative situations as threatening. They also believe that aversive consequences will occur following a failure.

Confirmatory factor analysis conducted by Conroy[6] revealed satisfactory goodness of fit indexes for the five dimensions when tested as a five correlated-factor model as well as a higher-order factor model.

Research using PFAI, showed good psychometric proprieties including internal consistency, factorial validity, and temporal stability[6,14-16]. However, according to our knowledge, no author has verified the convergent and discriminant validity of each factor till date.

To our knowledge, the PFAI has been applied in sport and exercise contexts mainly with North American athletes[14–17]. There were, however, three other studies conducted outside the USA. Specifically, Sideridis and Kafetsios[18] examined fear of failure in high school and college students in an educational setting in Greece. While Sagar and Jowett[13] examined the psychometric proprieties of the PFAI with British sport participants, and two years later, the same authors[19] explored the effects of personal and contextual factors such as age, gender, sport type, and level of sport participation on athletes' fear of failure.

The aim of this study was to conduct a cross-cultural adaptation of the PFAI. More specifically, we intended to analyze the factor structure as it was proposed by the PFAI's authors. Furthermore, into a more refined analysis, we tested the model to determine the following: its internal consistency, convergent, and discriminant validity; the invariance of the structure with a cross-validation strategy; and to explore its concurrent validity with Portuguese athletes.

Having a reliable measure that can provide individual beliefs of perceptions of failure in a sport context is essential since sport is a highly evaluative situation in one of the most popular achievement domains.

Method

Participants and data collection

A total of 556 athletes distributed in two convenience samples participated in the study. They competed in a variety of individual (e.g., athletics, climbing, surfing, tennis, orienteering, and swimming) and team sports (e.g., soccer, volleyball, and basketball) at club and school level, from different competition levels. The mean age of the first sample (n = 350) was 15.65 years old (SD = 2.45) and approximately two-thirds were males (72%). Regarding the second sample (n = 206), the mean age of the participants was 15.29 years old (SD = 2.47) and the great majority were males (79.6%).

Prior to data collection, the study was reviewed by the University Ethics Board. Upon approval, participants were recruited. Clubs, sport associations and schools were contacted by e-mail or by telephone and were invited to participate.

Once club and school authorizations were provided, letters and parental consent forms were sent home to parents for participants under the age of 18 informing them of the nature of the study and requesting their permission for their child's participation. All participants, including minors, signed consent forms.

Measures

The Performance Failure Appraisal Inventory[6] is a multidimensional measure of threat appraisals associated with one's fear of failure. Participants were asked to rate how strongly they believed each of the 25 aversive consequences of failure were likely to occur to them following a failure. The measure assessed the strength of their beliefs about possible consequences of failure across five domains: experiencing shame and embarrassment, devaluing one's self-estimate, having an uncertain future, important others losing interest, and upsetting important others. Items were answered on a five-point Likert scale ranging from 1 (*do not believe at all*) to 5 (*truly believe*).

The Portuguese version of the Sport Anxiety Scale–SAS-2[20] translated and adapted by Cruz and Gomes[21] has three subscales (somatic anxiety, worry, and concentration disruption) consisting of five items each. This scale was used for concurrent validity proposes. The 15 items of the SAS-2 were designed to reflect possible responses that young athletes may have before, or while, they compete in sports. For each item, athletes indicated how they typically felt, based upon a five-point Likert scale, ranging from 1 (*not at all*) to 5 (*very much*).

PFAI Translation Procedures

Once approval was obtained from the original scale author, the translation of the PFAI was performed using a five-stage process (e.g., *translation, synthesis, back-translation, review of content validity,* and *pre-testing*) [22].

Data Analysis

Data were analyzed using AMOS 22.0 and a confirmatory factor analysis (CFA) was performed to assess the psychometric proprieties of the PFAI instrument. The maximum likelihood (ML) method was used since it is considerably more insensitive to variations in sample size and kurtosis and tends to be more stable, demonstrating higher accuracy in terms of empirical and theoretical fit compared to other estimators[23]. Standardized factor loadings, standard residuals, and modification indices were analyzed to screen for possible model misspecification.

In order to confirm the factorial structure of the PFAI model, an analysis was conducted using the Conroy, Willow, and Metzler[6] model. Given that this is a second-order model, we selected a two-step confirmatory strategy (as suggested by Byrne[24], Kline[25], Schumaker and Lomax[26]). Initially, a test was conducted on the first-order model and after, in a second step, we tested the second-order model.

The appropriateness of the model was tested using a variety of goodness-of-fit indexes. Specifically, the measurement model was assessed with the chi-square (χ^2) statistical test, the ratio of χ^2 to its degrees of freedom (χ^2/df), comparative-of-fit-index (CFI), goodness-of-fit index (GFI), parsimony comparative-of-fit-index (PCFI), parsimony goodness-of-fit index (PGFI), and root mean square error of approximation (RMSEA). The χ^2 value has been identified as potentially problematic due to sample size sensitivity, but its value is reported since it represents the only true inferential statistic of model testing[27]. Given its sensitivity to sample size, the χ^2/df was also used as a measure of model fit[28]. Research practices using these indices state that values for the χ^2/df should be less than 3, PCFI and PGFI above .60, while values above .90 for the CFI and GFI, and below .05 for the RMSEA represents a good fit[29–33].

Internal consistency (reliability) of the constructs was assessed through composite reliability and we followed the recommendations of Fornell and Larcker[34] to calculate composite reliability (CR), in which it is recommended that values ≥ .7 indicates a proper value of CR.

Convergent validity was evaluated through the average variance extracted (AVE), whereby the values of AVE ≥ .5 are appropriate indicators of convergent validity[35].

Discriminant validity was established when AVE for each construct went beyond the squared correlations between that construct and any other[35]. In order to verify PFAI's factorial invariance, cross-validation procedures were used with a multi-group analysis strategy[36–38].

A multi-group analysis was conducted to compare the first sample with the second sample in order to access cross-validity. The model's invariance was tested by comparing the unconstrained model with constrained models (factor loadings fixed and variances/co-variances fixed). Factorial invariance was accepted when the models did not differ significantly (p > 0.05), according to the qui-square statistic[39,40]. As the qui-square difference tests represent an excessively stringent test of invariance, we also considered Cheung and Rensvold's[41] suggestion that a difference of CFI of less than or equal to .01 is an indication that the constrained parameters are invariant.

Concurrent validity was analyzed by Pearson's correlation coefficients between the PFAI's and the SAS's dimensions as well as their total score values[42].

Results

Preliminary Analysis

Preliminary analyses were performed on the data in order to scan for evidence of non-normality, univariate and multivariate outliers, and patterns of missing data. No missing values were found within the data.

The assumption of normality for confirmatory factor analysis was examined using measures of skewness and kurtosis. Absolute values of skewness ranged from – 0.132 to 2.211 (*SD* = 0.56) and absolute values of kurtosis ranged from – 1.324 to 4.842 (*SD* = 1.42). According with these values, we decided that the data was approximately univariately normal, since items with absolute values of skewness lower than 3 and kurtosis lower than 7 did not deviate enough from the normal distribution[43].

Results revealed that data violated the assumption of a multivariate Gaussian distribution since Mardia's (1970) values have been noted as a sign of multivariate kurtosis[44,45]. Based upon the Mahalanobis distance statistic, 14 multivariate outliers were identified from the sample and were consequently removed. Thus, it was decided to adjust the *p* value of the chi-square statistic with the bootstrapping procedure of Bolen and Stine[46].

Evaluation of Model Fit

At first, not all estimated factor loadings exceeded the cut-off point of .50,[39] ranging from .10 to .81. The goodness-of-fit indices produced for this first order measurement model also indicated poor fit [χ^2 = 748.088, B-S $p < 0.01$; χ^2/df = 2.82, PCFI = .74, PGFI = .69, CFI = .84, GFI = .85, RMSEA = .07] showing that the hypothesized measurement model is inconsistent with observed data, which is interpreted as evidence against the adequacy of measuring the model. This poor fit is specifically perceived in the values of the CFI and GFI that were below the cut-off point of .90.[39].

Post hoc model adjustments were conducted in an effort to develop a better fitting model due to the lack of support from CFA. The results in the original model (first-order model) indicated that not all items loaded significantly on its construct. Since nonsignificant parameters can be considered unimportant to the model, in the interest of scientific parsimony, all scale items that showed unacceptable factor loadings were removed[24]. Furthermore, examination of the modification indices (MI) suggested that an improved model resulted in the elimination of specific items, following the intent of Chartrand, Robbins, Morril, and Boggs[47] to create "*pure measures of each factor*" (p. 495) by allowing items to load on only one factor. According to Byrne[24], large MI argues the presence of factor cross-loadings (i.e., a loading on more than one factor) and error covariances, respectively.

The indices of fit indicated a noteworthy improvement of the hypothesized first-order model, as reported in Table 1.

Table 1. PFAI's Re-specified 1st Order Model – Factor Loadings, Z-values, Composite Reliability (CR), and Average Variance Extracted (AVE)

PFAI factors/items	Loadings	Z-value	CR	AVE
FSE			.789	.558
Item 18	.638	11.939		
Item 25	.736	14.441		
Item 24	.852	17.239		
FDSE			.754	.511
Item 15	.576	10.037		
Item 04	.708	13.480		
Item 07	.837	16.062		
FUF			.768	.624
Item 02	.772	14.351		
Item 08	.807	15.017		
FIOLI			.766	.521
Item 11	.715	13.563		
Item 21	.727	13.864		
Item 23	.724	13.778		
FUIO			.774	.540
Item 03	.560	10.136		
Item 14	.762	14.910		
Item 19	.852	16.950		

Note. FSE = fear of experiencing shame and embarrassment; FDSE = fear of devaluing one's self-estimate; FUF = fear of having an uncertain future; FIOLI = fear of important others losing interest; FUIO = fear of upsetting important others.

Evidence of discriminant validity was accepted since none of the squared correlations exceeded the AVE values for each associated construct[34].

After these procedures, the model adjusted to the data. The results demonstrated an acceptable fit [χ^2 = 146.63, B-S $p < 0.001$; χ^2/df = 2.19, PCFI = 0.70, PGFI = 0.60, CFI = 0.96, GFI = 0.94, RMSEA = 0.06]. Composite reliability values ranged from .75 (fear of devaluing one's self-estimate) to .79 (fear of shame and embarrassment), indicating that the constructs were internally consistent[35]. Evidence for convergent validity was obtained since AVE values ranged from .51 (fear of devaluing one's self-estimate) to .62 (fear of having an uncertain future), being greater than the recommended standard of .50.[34]

Conroy[6] hypothesized a higher-order factor model, whereby the five dimensions of fear of failure were incorporated under a general factor. The second-order measurement model showed an overall acceptable fit to the data [χ^2 = 176.32, B-S $p < 0.001$; χ^2/df = 2.42, PCFI = 0.75, PGFI = 0.64, CFI = 0.94, GFI = 0.93, RMSEA = 0.07].

Cross-validity

Cross-validation procedures were used[38] in order to study the adequacy of model replication. More specifically, a cross validation technique using a multi-group analysis with two equivalent samples in their characteristics ($n_{testing}$ sample = 350; $n_{validation}$

sample = 206) and then a technique of parameter-invariance to verify the equivalence between the two groups[36].

As exposed in Table 2, the fit of the unconstrained model [Model A: $\chi^2(134) = 210.77$ (B-S $p < .001$), PCFI = 0.71, PGFI = 0.60, CFI = 0.96, GFI = 0.92, RMSEA = 0.041] was acceptable. The fit of this model provides the baseline value against which all subsequently specified invariance models are compared[24]. The models with constrained factor loadings [Model B: $\chi^2(143) = 216.05$ (B-S $p < .001$), PCFI = 0.75, PGFI = 0.62, CFI = 0.96, GFI = 0.92, RMSEA = 0.039], and with constrained variances/covariances [Model C: $\chi^2(158) = 234.87$ (B-S $p < .001$), PCFI = 0.83, PGFI = 0.69, CFI = 0.96, GFI = 0.91, RMSEA = 0.04], showed a satisfactory fit. The qui-square statistic showed no significant differences between Model A and Model B [χ^2dif (9) = 5.28; $p = .81$], and also no significant differences between Model A and Model C [χ^2dif (24) = 24.10; $p = .46$]. There were no differences in the CFI values for all model comparisons. Thus, the results demonstrated the model's invariance in both samples, indicating that the factorial structure of the scale was stable in the two independent samples.

Table 2. Results of the Multi-Group Analysis across the Unconstrained Model and the Constrained Models of the PFAI (Testing Sample: n = 350; Validation Sample: n = 206)

Multi-group models	χ^2	df	$\Delta\chi^2$	Δ *df*	B-S p	CFI	GFI	PCFI	PGFI	RMSEA
Model A	210.77	134	-	-	-	.96	.92	.71	.60	.041
Model B	216.05	143	5.28*	9	<.01	.96	.92	.75	.62	.039
Model C	234.87	158	24.1*	24	<.01	.96	.91	.83	.69	.038

Note. χ^2= chi-square; *df* = degrees of freedom; $\Delta\chi^2$= chi-square difference; Δdf=degrees of freedom difference; B-S p = Bolen-Stine *p*-value; CFI = comparative fit index; PCFI = parsimony comparative fit index; GFI = goodness of fit index; PGFI = parsimony goodness of fit index; RMSEA = root mean square error of approximation.
**p*-value > .5.

Concurrent Validity

The results presented in Table 3, related to the correlations used to examine the relationships among the PFAI and SAS-2, reveal that the PFAI and SAS-2 sub-scales were positively correlated. The fear of failure scores were also positively related to concentration disruption, somatic anxiety, worry, and total sport anxiety scores.

Table 3. Correlation Matrix between Performance Failure Appraisal Inventory (PFAI) and Sport Anxiety Scale–2 (SAS-2)

	FSE	FDSE	FUF	FIOLI	FUIO	FF
SAS–Concentration disruption	.34*	.42*	.41*	.26*	.27*	.45*
SAS–Worry	.49*	.49*	.33*	.29*	.42*	.54*
SAS–Somatic anxiety	.32*	.40*	.31*	.18*	.20*	.38*
SAS–Total score	.50*	.56*	.44*	.32*	.39*	.56*

Note. FSE = fear of experiencing shame and embarrassment; FDSE = fear of devaluing one's self-estimate; FUF = fear of having an uncertain future; FIOLI = fear of important others losing interest; FUIO = fear of upsetting important others; FF = fear of failure total score.
*Bolen-Stine $p < .01$

Discussion

This study aimed to investigate a cross-cultural adaptation of the PFAI originally developed by Conroy[6] and to test its factorial validity in a Portuguese sport setting.

The construct of fear of failure has been mainly tested and used in North American and British populations, but it was yet to be explored within the Portuguese population.

The confirmatory factorial analysis performed on the PFAI with a sample of 556 athletes provided some support to the five-factor structure proposed by Conroy[6]. Conversely, some items revealed unacceptable factor loadings in their different sub-scales and were eliminated, generating a more effective model. The items elimination procedure was done since it minimized content redundancy and shortened the questionnaire significantly, which is very convenient in competitive sport settings, without affecting its content broadness and relevance. As such, the scale modifications resulted in a shorter questionnaire containing 14 items, representing the original five factors originally developed by Conroy[6].

The confirmatory factorial analysis using the re-specified model showed an acceptable fit of the data. The first-order construct showed composite reliability, convergent validity, and discriminant validity for each factor. A second-order model was tested and the analysis revealed an adequate fit for this final model.

The model's invariance in two independent samples was supported, indicating cross validity. With this outcome, it is assumed that the instrument is operating exactly the same way and that the underlying construct being measured (i.e., fear of failure) has the same theoretical structure for both groups.

PFAI's concurrent validity has been ascertained with the Sport Anxiety Scale-2 (SAS-2), pointing to its high concurrent validity. PFAI scores have exhibited appropriate concurrent validity with measures of worry, sport anxiety, cognitive disruption, and somatic anxiety[6,48]. In this regard, it is important to acknowledge that fear of failure is a subclass of performance anxiety constructs in sport[6], so it was not surprising that fear of failure was strongly related to sport anxiety. This result is similar to previous findings where fear of failure has been associated with dispositional performance anxiety (worry, concentration disruption, somatic anxiety)[6,15,16]. These results provide an additional outcome for the validity of the PFAI as an adequate tool for research.

All dimensions of the PFAI showed a statistically significant relationship with this second-order construct, with the strongest predictor being fear of important others losing interest (.82), followed immediately by fear of experiencing shame and embarrassment (.78) and fear of having an uncertain future (.78).

Finally, there are limitations that need to be acknowledged. First, there was a large age range in the present study, representing a wide variety of sport experiences. Therefore, future studies should collect stratified samples of sport populations and sport experiences to better understand the fear of failure among athletes. Second, the PFAI does not assess all possible fear of failure appraisals, such as the beliefs of failure associated with (a) wasting one's efforts, (b) losing a special opportunity, or (c) experiencing tangible losses[12]. Furthermore, there may be other beliefs concerning aversive consequences of failure not identified by Conroy[12] or even existing cross-cultural differences that may provide different beliefs of aversive consequences of failure. On this behalf, it should be pertinent to include a qualitative inquiry in order to provide a holistic understanding of the athlete's fears of failure. Third, the present study is a cross-sectional survey and, as such, its findings do not inform us whether athletes' fear of failure appraisals levels oscillate over time in accordance with different events that take place in a sporting season or throughout a sport career. Future research will benefit from longitudinal designs over a sporting season and career, also essential for attaining predictive validity of the PFAI's Portuguese version. Fourth, the differences between our sample and the original sample used by Conroy[6] could provide dissimilar interpretations. The sample from the original study was composed uniquely with college students, having a considerably higher mean age, comparatively with our sport leagues and federations sample. Therefore, it will be essential to examine in future studies the different characteristics such as athletes' age and as well as gender, sport type, and performance level associated with fear of failure.

Conclusions

The PFAI is a valuable instrument for researchers and practitioners (e.g., sport coaches, coaching scientists, and psychologists) who want to assess fear of failure in such diverse settings as sport, exercise, and education[13]. The role of the PFAI in sport settings is vital, and this study provided a distinctive utility to scholars and coaches since from a practical point of view, it can be employed as a diagnostic tool in the assessment with implications for treatment and prevention of fear of failure, providing a precious help identifying individuals' maladaptive appraisals (or threat appraisals) associated with failure.

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Appendix

(Questionário Multidimensional do Medo de Falhar no Desporto)

Medo de Sentir Vergonha e Embaraço (MSVE)
9. Quando estou a falhar, é embaraçoso quando estão outras pessoas a assistir.
13. Quando estou a falhar, preocupo-me com o que os outros pensam de mim.
14. Quando estou a falhar, preocupo-me que os outros pensem que não me estou a esforçar.
Medo de Desvalorizar a Autoestima (MDAE)
8. Quando não estou a ter sucesso, fico em baixo muito facilmente.
3. Quando estou a falhar, culpo a minha falta de talento/jeito.
4. Quando estou a falhar, tenho medo de não ter talento/jeito suficiente.
Medo de Ter um Futuro Incerto (MFI)
1. Quando estou a falhar, o meu futuro parece-me incerto.
5. Quando estou a falhar, perturba o meu "plano" para o futuro.
Medo que Outros Importantes Percam Interesse (MOPI)
6. Quando não estou a ter sucesso, as pessoas ficam menos interessadas por mim.
11. Quando não estou a ter sucesso, algumas pessoas perdem definitivamente o interesse por mim.
12. Quando não estou a ter sucesso, o meu valor diminui para algumas pessoas.
Medo de Preocupar Outros Importantes (MPOI)
2. Quando estou a falhar, preocupo as pessoas que são importantes para mim.
7. Quando estou a falhar, aqueles que são importantes para mim não ficam contentes.
10. Quando estou a falhar, aqueles que são importantes para mim ficam desapontados.
Note. Item numbers are provided to identify the sequence of administration.

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