

# Measuring Self-Efficacy to Deal With Infertility: Psychometric Properties and Confirmatory Factor Analysis of the Portuguese Version of the Infertility Self-Efficacy Scale

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**Abstract:** This study explores the psychometric properties and factor structure of the Portuguese version of the Infertility Self-Efficacy Scale (ISE-P), using translation and back-translation of the original version; principal component analysis; confirmatory factor analysis (CFA); and internal consistency, and test–retest reliability analyses. A total of 287 participants (156 women and 131 men) seeking medical treatment were recruited from public and private fertility centers. CFA revealed that the single-component model fit the data well. The instrument showed excellent internal consistency, good test–retest reliability, and correlations with other mental health measures suggesting good convergent and discriminant validity. In conclusion, The ISE-P is a valid and reliable Portuguese-language measure of perceived self-efficacy to cope with infertility. © 2012 Wiley Periodicals, Inc. *Res Nurs Health* 36:65–74, 2013

**Keywords:** infertility; self-efficacy; psychometric properties; confirmatory factor analysis

According to the European Society for Human Reproduction and Embryology (2011, p. 1062), infertility can be defined as “a disease of the reproductive system defined by the failure to conceive after 12 months of regular unprotected sexual intercourse.” In 2002, the World Health Organization reported that infertility

affects approximately 10–15% of the world population. In Portugal, researchers who conducted the Afrodite Study (Silva-Carvalho & Santos, 2009) found a prevalence between 9% and 10%. Nevertheless, definitions of infertility are not homogeneous, and this may lead to difficulties regarding comparisons across

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countries or over time (Gurunath, Pandian, Anderson, & Bhattacharya, 2011).

Over the past few years, significant progress has been achieved in reproductive medicine. The development of new medically assisted reproductive technologies has enabled more couples to fulfill their desire to become parents. However, medical treatments are frequently described as stressful because they include invasive procedures, such as daily injections, ultra-sound scans, and blood and sperm samples. Amongst other stressors, there may be changes in the couple's family and social networks, interpersonal difficulties, sexual problems, and financial burden (Newton, Sherrard, & Glavac, 1999; Peterson, Gold, & Feingold, 2007).

The impact of infertility and medical treatment on the psychological well-being of couples has received increasing attention in the past few years, particularly when assisted reproduction techniques are applied. Discovering the inability to conceive a biological child often leads to an unexpected experience of infertility stress both in men and women, and also in the couple as a unit (Burns & Covington, 2006; Menning, 1980). Although descriptive literature presents infertility as a very distressing condition, particularly for women, studies of the psychological consequences of infertility have produced mixed results (Chen, Chang, Tsai, & Juang, 2004; Eugster & Vingerhoets, 1999; Greil, 1997; Verhaak, Lintsen, Evers, & Braat, 2010; Verhaak & Smeenk, 2007; Volgsten, Skoog, Ekselius, Lundkvist, & Sundstrom, 2008). The majority of infertile couples learn how to cope with infertility, but some cannot adjust to this stressful condition and suffer problematic emotional responses, such as depression and anxiety (Ramazanzadeh, Noorbala, Abedinia, & Nazhizadeh, 2009). Cousineau and Domar (2007) reported that emotional responses may also have a negative impact on the results of medical treatments and may result in an early discontinuation of medical treatment, decreasing the couples' probabilities of achieving a pregnancy. For example, Brandes et al. (2009) reported that 34% of couples discontinuing fertility treatment indicated emotional distress as the cause for their decision. In this context, there is a growing body of literature addressing infertility-related psychological constructs and the development of measures for this purpose.

Self-efficacy is an important construct studied across numerous health areas (e.g., cancer, diabetes, arthritis, physical activity, perimenopause,

and condom use). It has been shown to be a relevant construct regarding health promotion and outcomes. Self-efficacy relates to beliefs people have about their own abilities to achieve goals. Thus, individuals who present high levels of self-efficacy tend to perceive themselves as individuals with the required problem-solving skills (Bandura, 1994). They tend to look at demanding tasks from a standpoint of challenge rather than of threat, set significant goals and commit to accomplishing them (Yong, 2010). Infertile patients who are capable of sustaining high self-efficacy to cope with infertility might present a more positive emotional status, persist with medical treatment or achieve a family-building resolution other than the one with biological children (Cousineau et al., 2006). Thus, self-efficacy to deal with infertility can be defined as the "patients' confidence levels on aspects of cognitive, emotional and behavioral skills related to infertility and its medical treatment" (Cousineau et al., 2006, p. 1693). It involves several self-regulation processes (cognitive, affective, and motivational) and determines the appropriate skills in order to deal with various situations.

In order to assess the way infertile patients perceive their abilities to face infertility and the strains of medical treatment, the Infertility Self-Efficacy Scale (ISE) was developed (Cousineau et al., 2006). The ISE has been used to evaluate the efficacy of psychological interventions for infertility (Cousineau et al., 2008; Hammerli, Znoj, & Barth, 2011). As a clinical tool, the ISE may also be useful in the screening of patients who present a poor perception of their skills to deal with infertility, in order to tailor-specific interventions aimed at empowering them. Although the ISE is broadly used, to our knowledge, the factor structure has not been confirmed in other published studies.

The aim of this study was to examine the psychometric properties of the Portuguese version of ISE (ISE-P) in a Portuguese sample of infertile patients seeking medical treatment for their fertility problems. Portuguese culture is quite traditional and conservative, with family being a core value. In this context, infertility is likely to have a significant impact on couples' lives, frequently leading to personal and social suffering. Thus, the ISE-P may be a useful tool to screen infertile patients and identify those requiring psychological support to deal with infertility. It is also worth noting that Portuguese is the third most spoken European language, with more than 240 million native speakers

spread across the globe, thus not restricting the use of the ISE-P solely to Portugal (Observatório da Língua Portuguesa, 2010).

In this study, exploratory factor analysis was performed in order to assess the structure of the Portuguese version because translation and cultural aspects may alter the factor structure. Determining factor structure was also a major objective because it may provide stronger confidence in validity of the ISE-P and offer a better understanding of the infertility self-efficacy construct.

As in the original version, our hypothesis was that the ISE-P would show a single-factor solution that measures cognitive/affect regulation when dealing with the infertility diagnosis and treatment.

## Methods

### Participants

A sample of 287 infertile patients (156 women and 131 men) seeking medical treatment in public and private infertility centers provided their informed consent for participation in the study. All participants presented a primary infertility diagnosis. The participants were recruited as part of larger study of psychological characteristics of Portuguese patients seeking treatment for infertility.

Patients were contacted by their medical doctors and were at various stages of infertility treatment. Clinical information regarding infertility was provided by the participants (there was no consulting of medical records). The study was previously approved by ethical committees of public centers and clinical directors of private centers and was supported by the Portuguese Fertility Association.

Inclusion criteria were age (18 years or older), and an infertility medical diagnosis. Participants were all married or living with a partner in a heterosexual relationship (Portuguese law requirements for access to assisted reproductive technologies).

### Measures

The *Infertility Self-Efficacy Scale-Portuguese (ISE-P)* (ISE; Cousineau et al., 2006) is a self-report instrument aimed at assessing infertile patients' perception of their capability to use

their own cognitive, emotional, and behavioral abilities for dealing with the infertility diagnosis and medical treatment. Sample statements include *I feel confident I can ...* "Ignore or push away unpleasant thoughts that can upset me during medical procedures." "Handle personal feelings of anger and hostility," "Keep active with my usual life routine." Subjects are asked to rate on a 9-point scale the degree in which they think they feel confident. The 16 items converged in a single-component of "cognitive/affect regulation" accounting for 55.55% of total variance. In its original version the ISE presented an excellent internal consistency (Cronbach alpha = .94) and correlations with other mental health measures suggested good convergent and discriminant validity. Test-retest reliability ( $r = .91$ ;  $p < .01$ ) indicated that it is a relatively homogeneous scale that consistently measures the same construct (Cousineau et al., 2006).

The ISE was forward-backward translated from English to Portuguese and the two versions were then compared. Two English-fluent independent researchers translated the ISE instructions and items. Minor inconsistencies were found, and after discussion with the authors, a final translated version was achieved. This translated version was then back translated into Portuguese by a fluent native speaker who teaches English at a language school. Although there was a high level of correspondence between these two versions, confirming the equivalence between the original version and the translated one, changes were made in two items to improve their match with the English original (Hambleton, Merenda, & Spielberger, 2005; International Test Commission, 2010). The Portuguese version was then administered to a set of infertile men and women for pilot testing in order to assess item comprehensibility. In this pilot study, 25 participants (infertile patients) were asked to answer the ISE-P items and comment on any difficulties regarding the understanding of item content (identify items difficult to understand, items that were acceptable, and those straightforwardly understood). No difficulties were reported, and the participants stated that the items were clear and comprehensible.

The *Beck Depression Inventory* (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Portuguese version by Vaz-Serra & Abreu, 1973a, 1973b) is a widely used self-report instrument for the assessment of depressive symptoms in clinical and community samples.

Subjects are asked to answer 21 groups of statements, choosing the ones that better define what is happening to them. Data from the Portuguese population indicated that scores between 0 and 9 show the absence of depression, between 10 and 20 slight depressive states, between 21 and 30 moderate levels of depression, and over 30 severe depression (Vaz-Serra & Abreu, 1973a, 1973b). In the current study the Cronbach alpha was .90.

The *State Trait Anxiety Inventory form Y* (STAI-Y; Spielberg, 1973; Portuguese version by Daniel, 1996) is a well-known self-report inventory rated on a 4-point scale. The first 20 items assess state anxiety (the way subjects are feeling the moment they are answering) and the last 20 items measure trait anxiety (the way subjects typically feel). In the current study we used only the state anxiety subscale (STAI Y1). Mean scores found in the Portuguese general population were 39.97 ( $SD = 11.25$ ) (Daniel, 1996; Spielberg, 1973). In this study the Cronbach alpha was .94.

The *Coping Styles Questionnaire* (CSQ; Roger, Jarvis, & Najarian, 1993; Portuguese version by Dinis, Pinto-Gouveia, & Duarte, 2011) was used to measure coping style. CSQ is a 41-item instrument composed of three dimensions that evaluate detached-emotional coping (feeling of being independent from the event and the emotion associated with it), rational coping (task oriented) and avoidant coping (physical and psychological avoidance) (Dinis, Pinto-Gouveia, & Duarte, 2011; Roger et al., 1993). In this study the Cronbach alpha for detached-emotional subscale was .81, for the rational subscale .76, and for the avoidant subscale was .70.

The *Fertility Problem Inventory* (FPI; Newton et al., 1999; Portuguese version by Moura-Ramos, Gameiro, Canavarro, & Soares, 2012) is a self-report inventory designed to measure perceived infertility-related stress using a 6-point response scale. It is a reliable and valid measure that provides a global measure of infertility-related stress, but also addresses five homogeneous and relatively independent infertility-related domains: Social concern, sexual concern, relationship concern, need for parenthood, and rejection of childfree lifestyle (Newton et al., 1999). Confirmatory factor analysis (CFA) in a Portuguese sample suggested that two distinct dimensions of infertility-related stress are addressed by the FPI, namely the impact in life domains (life areas that are affected by infertility), and representations regarding the importance of parenthood (beliefs

about parenthood and childless in couples' lives) (Moura-Ramos, Gameiro, Canavarro, & Soares, 2012). In this study the Cronbach alpha for the FPI was .90.

## Procedures

**Data collection.** A set of self-report instruments including the scales above was completed by the sample and returned by mail.

**Data analysis.** All quantitative data were analyzed using predictive analytics software (PASW), v. 18. First, *t*-tests were conducted to explore whether there were differences between men and women regarding social demographic variables and scores on the ISE-P (Cohen, Cohen, West, & Aiken, 2003). Pearson correlation coefficients were calculated to investigate the association between demographic variables and our study variables. Pearson correlations were also used to assess associations between infertility duration and ISE-P scores. The relationship between ISE-P results and previous treatment cycles versus first treatment cycle was explored through point-biserial correlation. ISE-P results were compared across different infertility causes and different treatment protocols, through one-way ANOVAs.

Item analysis was performed based on the following criteria: inter-item correlations less than .35 or of more than .80; corrected item-total correlations below .50 or above .90.

To identify the components of the ISE-P, a principal component analysis (PCA) was performed. Beforehand, we verified the Kaiser-Meyer-Olkin (KMO) measure of sample adequacy, which yielded a value of .95 indicating that factor analysis was appropriate (Hutcheson & Sofroniou, 1999). Bartlett's test of sphericity was significant ( $\chi^2_{(136)} = 3617.59; p < .001$ ). A PCA with varimax rotation was chosen in order to follow procedures held for the original version of the scale. Criteria underlying the decision of the final version of the ISE-P were eigenvalues greater than 1.0, percentage of variance explained, communalities above .35, component loadings above .40, and the scree plot (Duntzman, 1989).

CFA of the ISE-P was conducted in order to evaluate the fit of the hypothesized single-factor model to the data. CFA accounts for measurement error, or variance, in indicator scores not explained by one or more factors, and these correlations between errors can be specified. This procedure was conducted using the

WLSMV (weighted least square parameter using a diagonal weight matrix with robust errors and means), since the observed variables may be considered ordinal variables in a 9-point response scale, with each latent variable representing a continuous variable. This was completed with structural equation modeling, using AMOS for Windows v. 18. The maximum likelihood method was used to examine the overall fit of the model to the corresponding observed variance and covariance matrices. Several measures (fit indexes) of the fit of the hypothetical ISE-P model to the observed data were considered. The normed chi-square (NC), the Comparative Fit Index (CFI), the Standardized Root Mean Square Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA), were examined. The NC corresponds to the chi-square value divided by its degrees of freedom and is less sensitive to sample size than the chi-square statistic. The CFI is based on a comparison of the chi-square value for a baseline model in which all variables are independent. The SRMR is a badness-of-fit (larger values signal worse fit) that reflects the average discrepancy between the correlation matrices of the observed sample and the hypothesized model. The RMSEA is a measure of the discrepancy between the covariances implied by the model and the observed covariances per degree of freedom. Overall guidelines indicate that NC values lower than 5 are acceptable (Brown & Cudeck, 1993); CFI values of 0.90 or greater indicate a good fit; SRMR values of 0.09 or lower suggest a good fit; and RMSEA values of 0.05 or lower suggest excellent fit, values of 0.08 or lower suggest good fit, and values of 0.10 or lower reflect marginal fit (Brown & Cudeck, 1993; Iacobucci, 2010; Kline, 2005). We tested the CFA using the same sample that was used in the PCA because our aim was not to modify the ISE-P, but to determine whether its single-factor solution was confirmed in our sample.

Internal consistency reliability was assessed using Cronbach's alpha coefficient, corrected total-item correlations, and Cronbach's alpha coefficient if an item was removed from the scale. Test-retest reliability was assessed through Pearson correlation coefficient (correlation between scores from the first administration and scores from a second administration, 10 weeks later, in a subsample of 35 women).

Convergent and discriminant validity were tested using correlations between the ISE-P and demographic and clinical characteristics, and

other measures (e.g., depression, anxiety, coping styles, and infertility-related stress).

## Results

### Sample Characteristics

A total of 156 women and 131 men participated in the study ( $N = 287$ ). All participants were either married (83.20%) or cohabitating with a partner (16.80%) in a heterosexual relationship (criteria required by the Portuguese law to have access to assisted reproduction technologies). Women reported a mean age of 33.39 years ( $SD = 3.83$ ), mean years of education of 14.99 ( $SD = 2.92$ ), and had been married or living with a partner for a mean of 5.81 years ( $SD = 3.27$ ). Male participants averaged 34 years of age ( $M = 33.98$ ;  $SD = 4.16$ ), and 13 years of education ( $M = 13.23$ ;  $SD = 3.74$ ), and reported the duration of the relationship as a mean of 5.76 years ( $SD = 2.94$ ). The only significant sociodemographic difference between men and women was in years of education ( $t = -4.48$ ;  $p < .001$ ). Correlations were performed to explore whether years of education were related to the variables studied. Years of education did not correlate significantly with any variable.

Participants categorized the cause of their infertility as follows: Female factor (33.60%), male factor (27.50%), combined female and male factor (23.7%), and unknown factor or idiopathic (15.30%). Mean duration of infertility diagnosis was 2.83 years ( $SD = 2.48$ ). One hundred ten participants (70.50%) had already undergone previous treatment cycles, and 46 (29.50%) were pursuing their first treatment cycle. Concerning current medical treatment approach, 47 (30.10%) were waiting for test results or were on a break in proceedings, 44 (28.20%) were in an in vitro fertilization (IVF) protocol, 39 (25.00%) were pursuing intracytoplasmic sperm injection (ICSI), 16 (10.30%) were taking ovulation induction medications, and 10 (6.40%) were using intrauterine insemination (IUI).

No significant correlations were found between self-efficacy (ISE-P scores) and duration of infertility ( $r = -.01$ ;  $p = .900$ ), the performance of previous treatment cycle versus first treatment cycle ( $r_{pb} = .09$ ;  $p = .133$ ), or infertility causes [ $F(4, 281) = 1.45$ ,  $p = .230$ ]. The same pattern was found when comparing ISE-P scores across patients undergoing

different treatment protocols [ $F(4, 281) = .53$ ,  $p = .712$ ].

### Item Analysis and Principal Component Analysis

Means, standard deviations, item–total correlations, and Cronbach alpha if item deleted for the ISE-P items are presented in Table 1. Item–total correlations ranged from .70 to .88. Cronbach coefficient alpha did not increase with the exclusion of any of the ISE-P items.

Similar to the original version, the ISE-P PCA showed a single component structure, with an eigenvalue of 9.93, explaining 63.86% of the variance. Component loadings varied from .67 to .87, and communalities ranged from .45 to .76 (see Table 1). The scree plot analysis

also revealed only one factor above the elbow, contributing the most to the explained variance.

### Confirmatory Factor Analysis

A CFA was conducted to estimate the cross-cultural validity of the ISE-P in this sample. Multivariate normality assumption was calculated because we used, as previously mentioned, maximum likelihood estimation to evaluate the model parameters. Skewness and kurtosis values did not show a serious bias to normal distribution ( $SK < |3|$  and  $Ku < |10|$ ). Concerning the Mahalanobis Distance ( $DM^2$ ), some cases showed values that indicated the presence of outliers, but we decided to maintain them because otherwise the variability associated to the factor under study would diminish and

**Table 1. Means, Standard Deviations, Item–Total Correlations, Cronbach Alpha If Item Deleted, Component Loadings and Communality Estimates**

ISE item	<i>M</i>	<i>DP</i>	Item–total correlation	Cronbach $\alpha$ if item deleted	Component loading	Communality estimate
1. Ignore or push away thoughts that can upset me during medical procedures	5.74	2.01	.72	.96	.75	.56
2. Keep a sense of humor	6.52	1.97	.71	.96	.74	.55
3. Make meaning out of my infertility experience	6.21	2.03	.63	.96	.67	.45
4. Handle mood swings caused by hormonal treatments	5.74	1.97	.67	.96	.71	.50
5. Keep from getting discouraged when nothing I do seems to make a difference	5.49	1.98	.76	.95	.80	.63
6. Accept that my best efforts may not change my/our infertility	5.40	2.07	.74	.96	.77	.60
7. Control negative feelings about infertility	5.55	2.13	.85	.95	.87	.76
8. Cope with pregnant friends and family members	5.89	2.29	.72	.96	.76	.58
9. Handle personal feelings of anger or hostility	5.86	2.09	.76	.95	.79	.63
10. Keep a positive attitude	6.50	2.06	.83	.95	.86	.73
11. Lessen feelings of self-blame, shame, or defectiveness	6.39	2.10	.75	.95	.79	.62
12. Stay relaxed while waiting for appointments or test results	4.80	2.22	.77	.95	.81	.65
13. Do something to make myself feel better if I am sad or discouraged	5.89	1.88	.80	.95	.83	.69
14. Feel good about my body and myself	6.11	2.13	.76	.95	.80	.63
15. Keep active with my usual life routine	6.70	1.89	.79	.95	.82	.68
16. Feel like a sexual individual	6.63	2.04	.70	.96	.74	.54

constrict possible interpretation of interest in this analysis.

According to Brown (2003), it is frequently necessary to identify correlated measurement errors among items with similar phrasing (in the Portuguese version). For the ISE-P, correlated measurement errors were specified for items 4, 8, and 9 because we suspected that the use of similar key terms in these items could be influenced by method effects.

The one-factor model, which specified method effects between items 4, 8, and 9, fit the data well: NC = 3.8 (acceptable fit), SRMR = 0.04 (good fit), and RMSEA = 0.09 (marginal fit). The relative fit index CFI = 0.92 showed good fit (Marôco, 2010).

### Validity and Reliability

Convergent and discriminant validity were assessed by correlating the ISE-P with scores on the BDI (depressive symptoms), STAI Y1 (state anxiety), FPI (infertility-related stress), detached-emotional coping style (CSQ\_ED), rational coping style (CSQ\_R), and avoidant coping style (CSQ\_A). Correlations are presented in Table 2.

Correlations results showed low to moderate relationships between the ISE-P and the detached-emotional, rational and avoidant coping styles. Moreover, the correlation coefficients between measures of depression, state anxiety and infertility-related stress were negative and statistically significant, as expected. No significant correlations were found of social and demographic characteristics with the ISE-P.

The ISE-P presented an excellent internal consistency, with a Cronbach alpha of .96.

Test-retest reliability in 35 women who completed the ISE-P 10 weeks after the first administration showed a value of  $r = .77$ ;  $p < .001$ .

Significant differences were found between men and women ( $t = 6.95$ ;  $p < .001$ ). Men presented higher levels of self-efficacy to deal with infertility ( $M = 106.05$ ;  $SD = 21.92$ ) when compared to their female partners ( $M = 86.49$ ;  $SD = 25.21$ ).

### Discussion

The overall aim of this study was to examine the psychometric properties of the ISE-P in a sample of Portuguese infertile patients,

**Table 2. Correlations Between Infertility Self-Efficacy as Measured by the ISE-P and Depression, State Anxiety, Infertility-Related Stress, Emotional-Detached, Rational, and Avoidant Coping Styles**

Scale	Correlation with ISE-P
BDI (depression symptoms)	-.56**
STAI Y1 (state anxiety)	-.48**
FPI (infertility-related stress)	-.58**
CSQ_ED (detached-emotional coping style)	.43**
CSQ_R (rational coping style)	.26**
CSQ_A (avoidant coping style)	-.15*

\* $p < .05$ .

\*\* $p < .01$ .

including whether the single-factor structure of the English-language ISE was confirmed in the ISE-P. The PCA of the Portuguese version of the ISE scale presented, like its original version, an interpretable single component structure, excellent estimated internal consistency, good test-retest reliability, convergence with similar scales and ability to discriminate based on dissimilar scales and demographic and clinical characteristics. The CFA showed that the one factor model, with correlated errors among items 4, 8, and 9 due to their similar phrasing in the Portuguese version, fit the data well. These findings support the cognitive-affective regulation single-factor structure.

The gender differences we found were consistent with a large body of research suggesting that women tend to experience infertility as a more stressful condition when compared to their male partners (Abbey, Andrews, & Halman, 1991; Schmidt, Holstein, Christensen, & Boivin, 2005; Wischmann, Scherg, Strowitzki, & Verres, 2009; Wischmann, Stammer, Scherg, Gerhard, & Verres, 2001), and might perceive their ability to deal with it as less competent. The same pattern was found in the original version of the ISE scale, and the authors of the English ISE reported other evidence that beliefs about personal efficacy tend to affect emotional well-being for women (Cousineau et al., 2006). Future studies may explore the ISE-P structure separately in men and women.

Our data demonstrated that the ISE-P items added information that was not captured by the self-report measure of coping styles, showing low to moderate correlations with the detached-emotional, rational and avoidant coping styles. This was congruent with the idea

that self-efficacy must not be understood as a coping style or styles but rather seems to correspond to the perception of being capable of using cognitive, affective, and motivational self-regulation processes (Bandura, 1994). Results indicated that subjects who present the feeling of being independent from the event and the emotion associated with it (detached-emotional coping style) perceive themselves as more capable of using these types of coping strategies than those who are task-oriented and those who are avoidant, so individuals who perceive themselves as less capable of dealing with infertility tend to avoid more. These findings are in accordance with those of the original ISE research that showed that the use of cognitive distancing strategies may be an important self-regulation process in dealing with the difficulties arising from infertility (Cousineau et al., 2006).

Limitations of the study included difficulties in accessing a bilingual sample (same fluency in English as in Portuguese and experiencing infertility), which was an impediment to testing the equivalence of English and Portuguese items in more depth. The study was conducted in a heterogeneous group of infertile subjects at different stages of medical diagnosis and treatment. It would be interesting, in future studies, to address-specific phases of medical procedures in order to evaluate whether self-efficacy perception fluctuates according to different treatment stages with different challenges, an effect that has been observed, for example, with anxiety (Berg & Wilson, 1991; Yong, Martin, & Thong, 2000). However, in this cross-sectional study, clinical characteristics such as infertility causes, infertility duration, previous failed treatment cycles, or current medical treatment approach were not significantly associated with ISE-P scores.

Because our sample was recruited in public and private clinics, it was not possible to include patients who do not seek medical treatment or those who discontinue treatment, so ISE-P results cannot be generalized to these groups of patients. Future studies may also test the ISE-P for its predictive validity, evaluating whether it successfully predicts behavior change and psychological adjustment.

In summary, this study showed validity and reliability of the ISE-P in a Portuguese sample of infertile men and women and is, to our knowledge, the first to report a CFA of the ISE. The limited number of specific instruments for the assessment of infertility aspects in Portugal

also makes this study a step forward for research and clinical intervention in this area. For example, the ISE-P may be a useful screening instrument for identifying patients who perceive themselves as less competent to deal with infertility and its demanding treatment and who may need more specific psychological support. Furthermore, the availability of a Portuguese version of the ISE will also allow a broader application in countries where Portuguese is the official language.

## References

- Abbey, A., Andrews, F. M., & Halman, L. J. (1991). Gender's role in responses to infertility. *Psychology of Women Quarterly*, *15*, 295–316. DOI: 10.1111/j.1471-6402.1991.tb00798.x
- Bandura, A. (1994). Self-efficacy. In V. S. Ramachandran (Ed.), *Encyclopedia of human behavior* (Vol. 4, pp. 71–81). New York: Academic Press.
- Beck, A., Ward, C., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, *4*, 561–571.
- Berg, B. J., & Wilson, J. F. (1991). Psychological functioning across stages of treatment for infertility. *Journal of Behavioral Medicine*, *14*, 11–26.
- Brandes, M., van der Steen, J. O., Bokdam, S. B., Hamilton, C. J., de Bruin, J. P., Nelen, W. L., & Kremer, J. A. (2009). When and why do subfertile couples discontinue their fertility care? A longitudinal cohort study in a secondary care subfertility population [Research Support, Non-U.S. Gov't]. *Human Reproduction*, *24*, 3127–3135. DOI: 10.1093/humrep/dep340
- Brown, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage Publications.
- Brown, T. A. (2003). Confirmatory factor analysis of the Penn State Worry Questionnaire: Multiple factors or method effects. *Behavior Research and Therapy*, *41*, 1411–1426.
- Burns, L. H., & Covington, S. N. (2006). Psychology of infertility. In S. N. Covington & L. H. Burns (Eds.), *Infertility counseling: A comprehensive handbook for clinicians* (pp. 1–19). New York: Cambridge University Press.
- Chen, T. H., Chang, S. P., Tsai, C. F., & Juang, K. D. (2004). Prevalence of depressive and anxiety disorders in an assisted reproductive technique clinic. *Human Reproduction*, *19*, 2313–2318.
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: L. Erlbaum Associates.



- Cousineau, T. M., & Domar, A. D. (2007). Psychological impact of infertility. *Best Practice & Research: Clinical Obstetrics & Gynaecology*, *21*, 293–308.
- Cousineau, T. M., Green, T. C., Corsini, E., Seibring, A., Showstack, M. T., Applegarth, L., . . . Perloe, M. (2008). Online psychoeducational support for infertile women: A randomized controlled trial. *Human Reproduction*, *23*, 554–566. DOI: dem306 [pii]10.1093/humrep/dem306
- Cousineau, T. M., Green, T. C., Corsini, E. A., Barnard, T., Seibring, A. R., & Domar, A. D. (2006). Development and validation of the Infertility Self-Efficacy scale. *Fertility and Sterility*, *85*, 1684–1696. DOI: S0015-0282(06)00366-9 [pii]10.1016/j.fertnstert.2005.10.077
- Daniel, F. (1996). *Teoria e prática psicométrica—contribuição para a validação do STAI-Y de Spielberger em estudantes do ensino superior*. Master, Universitá de Extremadura, Badajoz, Spain.
- Dinis, A., Pinto-Gouveia, J., & Duarte, C. (2011). Contributos da validação da versão portuguesa do Questionário de Estilos de Coping. *Psychologica*, *54*, 35–62.
- Dunteman, G. (1989). *Principal component analysis*. London: Sage Publications.
- Eugster, A., & Vingerhoets, A. J. J. M. (1999). Psychological aspects of in vitro fertilization: A review. *Social Science & Medicine*, *48*, 575–589.
- European Society for Human Reproduction and Embryology. (2011). *ART glossary*. Retrieved June 9 2011, from <http://www.eshre.eu/ESHRE/English/Guidelines-Legal/ART-glossary/page.aspx/1062>
- Greil, A. L. (1997). Infertility and psychological distress: A critical review of the literature. *Social Science & Medicine*, *45*, 1679–1704. DOI: S0277953697001020 [pii]
- Gurunath, S., Pandian, Z., Anderson, R. A., & Bhattacharya, S. (2011). Defining infertility—A systematic review of prevalence studies. *Human Reproduction Update*, *17*, 575–588. DOI: dmr015 [pii]10.1093/humupd/dmr015
- Hambleton, R. K., Merenda, P. F., & Spielberger, C. D. (2005). *Adapting educational and psychological tests for cross-cultural assessment*. Mahwah, NJ: L. Erlbaum Associates.
- Hammerli, K., Znoj, H., & Barth, J. (2011). The efficacy of psychological interventions for infertile patients: A meta-analysis examining mental health and pregnancy rate. *Human Reproduction Update*, *15*, 279–295.
- Hutcheson, G., & Sofroniou, N. (1999). *The multivariate social scientist*. London: Sage Publications.
- Iacobucci, D. (2010). Structural equation modeling: Fit indices, sample size, and advanced topics. *Journal of Consumer Psychology*, *20*, 90–98.
- International Test Commission. (2010). *International Test Commission Guidelines for Translating and Adapting Tests*, from <http://www.intestcom.org>
- Kline, R. B. (2005). *Principles and practice of structural equation modelling* (2nd ed.). New York: The Guilford Press.
- Marôco, J., (2010). *Análise de equações estruturais: Fundamentos teóricos, software & aplicações*. Pêro Pinheiro: Report Number.
- Menning, B. E. (1980). The emotional needs of infertile couples. *Fertility and Sterility*, *34*, 313–319.
- Moura-Ramos, M., Gameiro, S., Canavarro, M. C., & Soares, I. (2012). Assessing infertility stress: Re-examining the factor structure of the Fertility Problem Inventory. *Human Reproduction*, *27*, 496–505. DOI: 10.1093/humrep/der388
- Newton, C. R., Sherrard, W., & Glavac, I. (1999). The Fertility Problem Inventory: Measuring perceived infertility-related stress. *Fertility and Sterility*, *72*, 54–62.
- Observatório da Língua Portuguesa. (2010). *Falantes de Português Retrieved 23rd August, 2012, from http://observatorio-lp.sapo.pt/pt/dados-estatisticos/falantes-de-portugues*
- Peterson, B. D., Gold, L., & Feingold, T. (2007). The experience and influence of infertility: Considerations for couple counselors. *The Family Journal: Counseling and Therapy for Couples and Families*, *15*, 251–257.
- Ramazanzadeh, F., Noorbala, A. A., Abedinia, N., & Nazhizadeh, M. M. (2009). Emotional adjustment in infertile couples. *Iranian Journal of Reproductive Medicine*, *7*, 97–103.
- Roger, D., Jarvis, G., & Najarian, B. (1993). Detachment and coping: The construction and validation of a new scale for measuring coping strategies. *Personality and Individual Differences*, *15*, 619–626.
- Schmidt, L., Holstein, B., Christensen, U., & Boivin, J. (2005). Does infertility cause marital benefit? An epidemiological study of 2250 women and men in fertility treatment. *Patient Education and Counseling*, *59*, 244–251.
- Silva-Carvalho, J. L., & Santos, A. (2009). *Estudo Afrodite caracterização da infertilidade em Portugal I—estudo na comunidade*. Porto: Universidade do Porto.
- Spielberg, C. D. (1973). *Manual for State-Trait Anxiety Inventory (Form Y)*. Palo Alto, USA: Consulting Psychologists Press.
- Vaz-Serra, A., & Abreu, J. (1973a). Aferição dos quadros clínicos depressivos I—estudo de aplicação do “Inventário Depressivo de Beck” a uma amostra portuguesa de doentes deprimidos. *Coimbra Médica*, *XX*, 623–644.
- Vaz-Serra, A., & Abreu, J. (1973b). Aferição dos quadros clínicos depressivos II—studo preliminar de novos agrupamentos sintomatológicos para complemento do “Inventário Depressivo de Beck” *Coimbra Médica*, *XX*, 713–736.
- Verhaak, C. M., Lintsen, A. M., Evers, A. W., & Braat, D. D. (2010). Who is at risk of emotional problems and how do you know? Screening of women going for IVF treatment. *Human*

- Reproduction*, 25, 1234–1240. DOI: deq054 [pii]10.1093/humrep/deq054
- Verhaak, C. M., & Smeenk, J. M. J. (2007). Women's emotional adjustment to IVF: A systematic review of 25 years of research. *Human Reproduction Update*, 13, 27–36. DOI: 10.1093/humupd/dm1040
- Volgsten, H., Skoog, S. A., Ekselius, L., Lundkvist, O., & Sundstrom, P. I. (2008). Prevalence of psychiatric disorders in infertile women and men undergoing in vitro fertilization treatment. *Human Reproduction*, 23, 2056–2063. DOI: den154 [pii]10.1093/humrep/den154
- Wischmann, T., Scherg, H., Strowitzki, T., & Verres, R. (2009). Psychosocial characteristics of women and men attending infertility counselling. *Human Reproduction*, 24, 378–385. DOI: den401 [pii]10.1093/humrep/den401
- Wischmann, T., Stammer, H., Scherg, H., Gerhard, I., & Verres, R. (2001). Psychosocial characteristics of infertile couples: A study by the 'Heidelberg Fertility Consultation Service'. *Human Reproduction*, 16, 1753–1761.
- Yong, F. L. (2010). A study on the self-efficacy and expectancy for success of pre-university students. *European Journal of Social Sciences*, 13, 514–524.
- Yong, P., Martin, C., & Thong, J. (2000). A comparison of psychological functioning in women at different stages of in vitro fertilization treatment using the mean affect adjective checklist. *Journal of Assisted Reproduction and Genetics*, 17, 553–556.