Work-Family Interference and Work-Family Facilitation: A study of measurement invariance between genders

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Abstract: Work-family relationship is a subject of great interest for research, and studies have shown differences between genders. The aim of this study was to analyze measurement invariance between men and women, with reference to Work-Family interference among teachers. The W-F Scale (Carvalho & Andrade, 2012) was applied to a sample of 610 Portuguese higher education teachers. Dimensionality was tested by means of exploratory and confirmatory factor analysis. The structure of the proposed theoretical model was well adjusted to the multi-group sample. Chi-square test was used to perform measurement invariance testing. Impact factors of the W-F Tension on Work and of W-F Tension on Family were invariant among teachers, indicating independence with regard to gender. Measurements for the remaining factors (Work Interference with Family, Family Interference with Work, Work as Family Life Facilitator, and Family as Work Facilitator) varied between men and women.

Keywords: work-family; work-family interference; work-family facilitation; gender differences; measurement invariance.

INTERFERÊNCIA TRABALHO-FAMÍLIA E FACILITAÇÃO TRABALHO-FAMÍLIA: ESTUDO DA INVARIÂNCIA DA MEDIDA ENTRE SEXOS

Resumo: A relação trabalho-família é uma temática com grande interesse para a investigação, cujos estudos têm revelado diferenças entre sexos. Pretendeu-se analisar a invariância da medida entre os sexos masculino e feminino relativamente à interferência Trabalho-Família em docentes. A Escala T-F (Carvalho & Andrade, 2012) foi aplicada a 610 docentes do ensino superior português. Estudou-se a sua dimensionalidade por meio de análises fatoriais exploratória e confirmatória. A estrutura do modelo teórico

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proposto mostrou-se bem ajustada na amostra de multigrupos. A invariância da medida foi testada com o teste de Qui-quadrado. Os fatores Impacto da Tensão T-F no Trabalho e Impacto da Tensão T-F na Família foram invariantes entre docentes, indicando uma independência face ao sexo. As medidas para os restantes fatores (interferência do trabalho com a família, interferência da família com o trabalho, trabalho como facilitador da família e família como facilitadora do trabalho) variaram entre os sexos.

Palavras-chave: trabalho-família; interferência trabalho-família; facilitação trabalho-família; diferenças de sexo; invariância da medida.

INTERFERENCIAS TRABAJO-FAMILIA Y LA FACILITACIÓN DEL TRABAJO Y LA FAMILIA: ESTUDIO DE LA INVARIANCIA DE LA MEDIDA ENTRE LOS SEXOS

Resumen: La relación trabajo-familia es una temática de interés para la investigación, y estudios han evidenciado diferencias entre sexos. Se analizó la invarianza de la medida entre hombres y mujeres relativamente a la interferencia Trabajo-Familia en docentes. La escala T-F (Carvalho & Andrade, 2012) fue aplicada a 610 docentes portugueses de educación superior. Se estudió la dimensionalidad mediante análisis factoriales exploratorio y confirmatorio. La estructura del modelo teórico propuesto se ajusta a la muestra de multigrupos. La invarianza de la medida fue testeada con la prueba Chi-cuadrado. Los factores Impacto de la Tensión T-F en el Trabajo e Impacto de la Tensión T-F en la familia fueron invariantes entre los docentes con respecto al sexo. Las medidas para los restantes factores (Interferencia del trabajo en la Familia, Interferencia de la Familia en el Trabajo, el Trabajo como Facilitador de la Familia, y la Familia como Facilitadora del Trabajo) varían entre sexos.

Palabras clave: trabajo-familia; interferencia trabajo-familia; facilitación trabajo-familia; diferencias de sexo; invariancia de la medida.

Introduction

Nowadays, work and family-life balance is one of the major challenges faced by developing countries, as well as one of the most important issues in the European Union, not only due to the individual implications that the balance between these two dimensions has, but also because of its organizational and social consequences (Baptiste, Fecher, Dolejs, Yoder, Schmidt, Couch, & Ceppa, 2017; Matias, Andrade, & Fontaine, 2011; McNall, Nicklin, & Masuda, 2010; Vithanage & Arachchige, 2017). Such is the relevance of the matter that the European Foundation for the Improvement of Living and Working Conditions considers a balance between professional and personal life to be one of the pillars of essential study when assessing individuals' life quality (EUROFOUND, 2014). In fact, demographic, technological and organizational changes have been the basis for greater developments we have witnessed throughout the last decades, making this subject one of the most relevant research topics these days. In addition, Portugal has been affected by changes that make the analysis of the Work-Family interface (W-F) increasingly relevant.

In the face of an evidently changing global work environment, managing the boundaries between work and family (or personal life) has become a growing challenge both for workers – demanding changes in the way they interact with their children, manage their household tasks and distribute their lives between the two roles (workers and parents) – and those in charge of running organisations, who care

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about responsible management of people at work (that is, with the excellence in the work and with a management based on the philosophy of family-friendly management). In this context, there are many disciplines that can contribute to this field of study, such as Social, Organizational and Work Psychology, whose contributions range from constructing and testing scales to evaluate the different facets of the work-family relationship, to analysing the antecedents and consequences of policies and practices for work and family life reconciliation that are beneficial to both parties (organization and workers). Valid and reliable measures are required, which can be applied with the same rigor and degree of confidence both to men and women (sex/gender). To that end, it is necessary to test measurement invariance, which from our point of view has not been stressed enough in the literature that deals with differences between sexes and genders.

Work-Family Interference and Work-Family facilitation: (brief) state of the art

Research in the field of work and family has increasingly grown. A systematic literature review carried out by Brau et al. (2016) between 2009 and 2014 revealed that as from 2011 this topic has grown in popularity and the number of studies in diverse populations of workers has increased as well, thus being considered by these authors a current and relevant research topic. There has recently been an increase of expressions to address the relationship between these two spheres, interfaces or domains (Family and Work). Such expressions (e.g., tension, conflict, interference, transference, contagion, equilibrium, conciliation, facilitation, and interface) have emerged as a result of several theories supported by different models and paradigms with regard to the work-family relationship. However, rather than criticizing (or defending) one theory against another, it is necessary to consider that combined they provide a range of analysis regarding the dynamism of the work-family interface, which is an increasingly broad and comprehensive domain (Carvalho & Chambel, 2016).

One of the most alluded concepts in the literature (which portrays a more neutral viewpoint of the authors concerning the topic) is that of the Work-Family Relationship (Carvalho & Andrade, 2012; Carvalho & Chambel, 2016), or Work-Family Interaction (Carvalho & Andrade, 2012), which is especially convenient when it comes to approaching the interface between these two spheres – work-family or family-work – and the direction (negative [conflict/interference/tension] or positive [contagion, enhancement, enrichment, facilitation]) (Byron, 2005; Carvalho & Chambel, 2016; Carvalho & Andrade, 2012; Feijó et al., 2017; Spector, Allen, Poelmans, Lapierre, Cooper, & O'Driscoll, 2007).

The conceptual difference between Work-Family Interference (WFI) and Family-Work Interference (FWI) seems to be very objective in prevailing literature. The WFI is marked by mutually incompatible pressures arising simultaneously from the work sphere and the family sphere (Greenhaus, & Beutell, 1985). Research in this area has highlighted the existence of differences between Work-Family Interference and

Family-Work Interference. The first one concerns work interference with the family (or personal) life of individuals (e.g., not attending a child's football game due to last-minute work commitments; failure to attend an important family dinner due to work requirements). On the other hand, the second one refers to the opposite effect, that is to say, family interference with work (e.g., being absent at work in order to care for a child who has fallen ill, or neglecting a task due to personal problems) (Cinamon & Rich, 2010). The same is true for the positive side of this relationship, Work-Family Facilitation (WFF) or Work-Family Enrichment (WFE), which implies an enrichment of the family role performance thanks to work experiences, i.e., the extent to which experiences on a role improve the quality of life in another role (e.g., experiences and knowledge gained from organizing and managing work tasks facilitate the organization and management of home or family tasks), and Family Work Facilitation (FWF) (e.g., knowledge gained from managing conflicts and interpersonal relationships at home becomes a source of learning, an aid in terms of managing interpersonal relationships at work, with colleagues and managers; ways of solving problems at home ease resolution and decision making at work) (Carvalho & Andrade, 2012; Cinamon & Rich, 2010).

In addition to the negative (predominant) and positive paradigms, the so-called integrative paradigm of the work-family relationship can also be found in the literature. This concept refers to a balance-oriented paradigm (frequently known as Work Life-Balance [WLB] in English; Vithanage & Arachchige, 2017), which has raised controversy in the literature: while some regard it as utopic, others understand it is still under development. Nevertheless, this viewpoint ultimately highlights the importance of the pursuit of satisfaction in every dimension of an individual's life, which is akin to seeking a reconciliation, match or balance for both the negative perspective of the conflict/tension and the positive perspective (enrichment) of the work-family relationship. Much like the paradigms above referred (more negative or more positive), this paradigm gave rise to several popular theories and models (which will not be addressed due to the length of this article).

As mentioned before, and in accordance with several authors (e.g., Carvalho & Andrade, 2012; Carvalho & Chambel, 2016; Edwards & Rothbard, 2000; Hobfoll, 1989; Jones, Burke, & Westman, 2006; Premeaux, Adkins, & Mossholder, 2007), research in this field over the past years has led to the development of various theories addressing possible mechanisms that could link these two areas (work-family), and several models have emerged. In this context, and after an extensive review of the literature, Edwards and Rothbard (2000) proposed an integrative framework of these work-family linking mechanisms, underlining six main explanatory mechanisms for the relationship (either positive or negative) between work and family, namely segmentation, spillover, compensation, congruence, scarcity of resources and work-family role conflict. Preference for one or some of these mechanisms when explaining work-family relationships will affect the way researchers interpret and propose interventions regarding such

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relationship. Briefly describing each of them, the segmentation mechanism assumes work and family as separate dimensions (both physically and psychologically), spillover, which is one of the most cited mechanisms in the literature, refers to the process whereby experiences (i.e., competencies, feelings, attitudes, and behaviors) in one sphere or domain affect the other domain; compensation is the mechanism whereby dissatisfaction in a life domain leads individuals to respond more actively, such as with greater investment in the other domain; the mechanism of congruence refers to the process of attributing another variable (e.g., personality, culture; Wayne, Musisca, & Fleeson, 2004) the responsibility for the way in which family life and work are congruent (or not); the mechanism of resource scarcity suggests that there is a limited transference of personal resources (e.g., energy, time, attention) between one domain or sphere and the other; finally, the work-family conflict mechanism implies that domain requirements are (often) mutually incompatible, i.e., meeting the requirements for one domain generates a tension that makes it difficult or even impossible to fully comply with the requirements for the other domain.

Most authors agree on the fact that, even in the 21st century, there are gender differences in role-playing, namely that women continue to take more responsibility for child care, household chores and care for relatives, at least in some cultures. Due to this additional activity, women often mention a high degree of stress and less satisfaction in their role performance as mothers compared to their partners. Likewise, they also show a tendency to consider that work interferes with their parental role (Barrette, 2009; Bianchi & Milkie, 2010; Hall, 1990; Shelton, 2006; Zhang & Liu, 2011).

Although men are increasingly reporting more involvement in tasks related to paternity and domestic responsibilities, when experiencing stress owing to the performance of both roles, they tend to obtain lower average scores and to show fewer signs of tension compared to women. This profile is based on men praising their status quo, trying to convey an image of dedication and professionalism, and avoiding showing the adjustments they make in order to attain reconciliation between their work and family responsibilities. Despite the vast amount of studies that have emerged about sex/genders differences in W-F, there is no agreement in the literature about the causes of these differences (Bianchi & Milkie, 2010), reinforcing the importance of psychometrics in this field of knowledge.

The Importance Work-Family and Family-Work interference measurements and measurement invariance study

In this day and age, we are increasingly witnessing new forms of work which, along with a transformation of the family concept itself, have led to a growing popularity of the Border Theory, whereby work and family spheres are more permeable and mutually influential (Carvalho & Chambel, 2016), making it hard to separate or outline the boundaries between one and another. Such influence can either be negative (due to some role conflict and the negative interference of demands coming from both

domains) or positive (by way of facilitation, which is based on the enrichment or beneficial effects of involvement in multiple roles, such as work and family or personal life) and the knowledge exchange between one domain and the other, thus contributing to broadening the spectrum of strategies that people can use to deal effectively with the challenges and the requirements placed by both domains (W-F/F-W). In light of such a dynamic scenario, new measures/scales become essential in order to evaluate these different forms of work and families, allowing for both positive and negative interferences being assessed, in addition to the way sex influences such interferences (W-F/F-W). In fact, the differences between sexes are constantly studied in the research field of the work-family relationship, for example by analyzing both the differences and the moderating effect of sex on the relationship between satisfaction at work and WF conflict (Feijó et al., 2017; Matias et al., 2011).

Portugal presents increasing female participation in the labor market, leading to a decline of the family model with a single member working outside the home (Matias, Andrade, & Fontaine, 2011). Moreover, families where both adults work currently outnumber those with only one working member, bringing about growing work and family demands to be faced by men and women. As a result, the responsibilities of professional work, domestic chores, and children or dependants' care are no longer confined to the traditional division of gender roles, reason why we raise the question of whether the measures that evaluate W-F/F-W interference and their dimensions are, on the one hand, appropriate to this new scenario and, on the other hand, equally understood by men and women. Furthermore, the differing relationship between the two spheres is increasingly evident for both sexes in Portugal, where there seems to be a difference between the work-family conflict and the family-work conflict among men and women, mostly owing to differences in what causes the conflicts (Matias et al., 2011). In our view, it is important to explore whether these sex differences in the W-F/F-W relationship and their effects persist in the light of the changes that affect not only the labor market, but also the family concept, the roles played by both sexes and the emergence of more family-owned enterprises, among other changes, as well as whether the instruments used for research purposes truly capture both sexes' perceptions on this matter.

As stated by Carvalho and Chambel (2016), Portuguese sex expectations continue to exist, often being women the ones who carry out domestic activities and care for children or dependants, making W-F reconciliation particularly difficult for them. Likewise, divorce rates have increased, and separations or new partnership unions are a fact, bringing about new configurations and new members to families (e.g., my children, your children, and our children). For these and other reasons, the specific case of Portugal is marked by having enough demands, challenges and potential sources of stress regarding the reconciliation of work with family life (Vieira, Lopes, & Matos, 2014), especially for women. That said, we understand that providing valid and reliable measures to assess levels of conciliation and interference, as well as to study the (in)variance of these measures, become more important than ever.

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In addition to the justification based on the state of the art that emphasizes the importance of assessment, the study of invariance is also based on the premise that the lack of measures of invariance between sexes with a certain scale leads to an assessment of dimensions that represents different aspects for both men and women, and this could cause a misinterpretation of the results obtained, meaning that we could be using a scale with potentially different measures (a priori) which, for example, may not allow reliable comparability of results between sexes (Raju, Laffittee, & Byrne, 2002).

Considering the literature indicates that measurement invariance tests are poorly studied (Raju et al., 2002), being particularly scarce regarding sex differences, the assessment of the measure's invariance regarding its dimensionality will contribute to bridging the gap in this area of research. Thus, the results will allow for more rigorous recommendations concerning the use and signaling interpretation constraints.

Objectives and study justification

Research carried out with teachers and higher education teachers regarding W-F conciliation has increased (Bragger, Rodriguez-Srednicki, Kutcher, Indovino, & Rosner, 2005; Cinamon & Rich, 2005; Guendouzi, 2006; Vithanage & Arachchige, 2017), indicating an explanatory background regarding the various behaviors found, reflected in the results of the W-F/F-W scales. However, studies in this area of knowledge with such population are still scant, especially in Portugal.

Given the above, the present study aims to explore the measurement invariance between men and women regarding Work-Family/Family-Work interference in higher education teachers in Portugal. The choice of this population for our research purpose owes to the knowledge we have about the characteristics of the population and the potential exposure to pressure factors that higher education teachers in Portugal and other countries are frequently subjected to (Baptiste et al., 2017), thus constituting an area of great interest, both in terms of studying the W-F/F-W relationship and the measurement invariance between sexes. Portugal has witnessed family, social and cultural changes during the last years, which have noticeably affected higher education teachers.

A retrospective analysis from 1978 to present days of the Portuguese higher education workforce shows a gradual increase of female participation. In 2011, there were 211.641 women and 184.627 men, revealing an increase of 27.014 women. The number of graduate women also followed this trend. In 1994, 20.581 out of 32.622 graduates were women. In 2010, 47.255 out of 78.609 graduates were women. The percentage of women trained in the education field in 1994 was 84%, and in 2010 such number rose to 85%. There is currently a strong female presence in Portuguese higher education, portraying both a social change concerning the role of women in society and a tendency towards greater equal opportunities for men and women.

Although the scale analysed in this research has previously shown good psychometric properties (Carvalho & Andrade, 2012), studies evaluating the measurement invariance between men and women are not known, which is a central dimension for future comparative studies and studies that seek to improve cultural characteristics of our country, especially regarding gender differences.

Method

The present investigation was based on invariance tests, using the structural equation modeling method and a cross-sectional design, based on the self-administered questionnaire survey. A non-probability convenience sampling method was carried out (Hill & Hill, 2000).

Participants

The sample consisted of 610 university professors from Portugal and Islands (299 men: 49.0%, 291 women: 47.7%, 20 non-respondents: 3.3%), aged between 22 and 90 years old. The age group between 31 to 47 years stands out, representing 59.2% of the sample. The sample is composed mostly of married teachers (60.8%), followed by 22.3% single, 7.7% divorced and 1.1% separated. Most have been teaching in higher institutions for more than 10 years (56.2%), and about 23.0% of the sample has been doing so for between 5 to 10 years.

Instruments

The W-F Scale consists of an overall measure of the relationship between work and family (in both senses), composed of a second order construct represented by first-order measures that evaluate, on the one hand, the reconciliation between work and family, and on the other, the tension between work and family.

Second-order measures comprise the dimensions of work-family interference (WFI) that were selected based on the Sloan Work-Family Researchers Electronic Network INTF Scales (MacDermid, Barnett, Crosby, Greenhaus, Koblenz, Marks, Perry-Jenkins, Voydanoff, Wethington, & Sabbatini-Bunch, 2000): Work's Interference with Family (WFI); Family's Interference with Work (FWI); Work as a Family-Life Facilitator (WFF); Family as a Work Facilitator (FWF); Impact of Work-Family Stress on Work (IWFSW); and Impact of Work-Family Stress on Family Life (IWFSF). The items that make up these scales summarise the best measures published in this area (e.g., Gutek, Searle, & Klepa, 1991; MacDermid et al., 2000; Netemeyer, Boles, & McMurrian, 1996).

Assessment of scales developed by MacDermid et al. (2000) have been very positive, and it was decided to compile them in a single scale, which was first translated into Portuguese in an academic context by Carvalho and Peralta (2009), and later tested in research carried out by the authors (e.g., Carvalho & Andrade, 2012; Carvalho, Peralta, & Castro, 2012; Carvalho, Mónico, Parreira, Fernandes, Salgueiro-Oliveira, Braga, &

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Gómez, 2016; Carvalho, Parreira, Mónico, & Ruivo, 2016). These authors proceeded to the translation and back-translation of the items into the Portuguese language, using the focus group methodology to discuss ideas, suggestions and reviews for each of the items, so that the final version of the items did not raise any doubts. They also used a pilot sample of 50 subjects to evaluate the degree of accessibility, adequacy and comprehension of the items of the W-F Scale and made brief adjustments in the final creation of the items.

In the final version of the questionnaire, participants are asked to answer 92 items on a four-point Likert scale (1- Rarely, 2- Sometimes, 3- Often, 4- Most often), reporting the last three months of their work and family/personal life. The items cover four major areas: energy (e.g., Because of my work, I did not have the energy to perform activities with my family or other important people in my life), strain (e.g., My job made it difficult to maintain the kind of relationship I wanted with my family), time (e.g., My work schedule makes it difficult for me to fulfill my responsibilities) and behavior (e.g., Behaviors that were effective and necessary for me at work were counterproductive at home). In addition to this scale, a socio-demographic questionnaire was also answered by participants.

Analysis of the psychometric properties of the W-F Scale

The dimensionality of the W-F Scale was analysed through exploratory factorial analyses (EFA) by means of the principal component analysis (PCA) with Varimax rotation. Prior to these analyses, the assumptions for its application were verified. The joint analysis of the correlation matrix, the anti-image matrix (partial correlations close to zero), from the KMO test (= .917) and the Bartlett Test of Sphericity [χ^2 (4278) = 27767.73, p <.001] support the adequacy of the data to perform the PCA with free extraction of factors.

The solution obtained after the first extraction pointed to keeping eight factors, which explained 51.1% of the total variance. Although the W-F Scale has a total of six factors, the emergence of eight factors in Screen Plot is perfectly understandable in that the responses to two of the factors ("Interference from Work with Family Life" and "Work as Facilitator of Family Life") are divided into" relative to own "and" relative to the spouse." Thus, a forced analysis of the six first-order factors was also adjusted, explaining 46.6% of the total variance. The internal consistency of the overall scale was excellent (α = .937).

Factor 1 refers to Work Interference with Family (WFI, 21.61% of variance explained (VE); α = .921], factor 2 refers to Family Interference with Work (FWI, VE = 7.24%, α = .810), factor 3 refers to Work as Family Life Facilitator (WFF, VE = 5.74%, α = (FFW, VE = 4.93%, α = .844), factor 5 refers to the Impact of Work-Family Stress on Work (IWFSW, VE = 3.49%; 943) and, finally, factor 6 refers to the Impact of Work-Family Stress on Family Life (IWFSF, VE = 3.28%, α = .946).

Formal and ethical procedures

This study fulfilled all the ethical requirements and was approved by the Ethics and Deontology Committee of Psychological Research by the Faculty of Psychology and Educational Sciences of the University of Coimbra on November 19th, 2015.

Data analysis

Data was processed using SPSS and AMOS version 22.0 (SPSS Inc, Chicago, IL). Normality was ensured by asymmetry (sk) and kurtosis (ku) values, and no results were found indicating severe infringement of the normality assumption (Finney & DiStefano, 2006; Kline, 2011), since | sk | <2.28 and | kuunivariate | < 4.70 (except only for one item with sk = 3.15 and ku = 10.48). Non-responses (missing-values, corresponding to 3.4% of the sample) were replaced by the series-mean method (Hair, Black, Babin, & Anderson, 2010). The univariate and multivariate outliers detected were classified as extreme. However, given the sample's size, they did not compromise the normality of the sample's distribution and were maintained in order to ensure the possibility of generalising results to the population. In addition, they portrayed a representative segment of the sample (Hair et al., 2010).

The global adjustment quality of the factorial models estimated by the maximum likelihood method was done by χ^2 indices ($p > .05$, but irrelevant if N> 500; Bentler 1990; Schumacker & Lomax, 2010), χ^2/gl (coefficients < 2 or 3 indicate a good fit, although coefficients are acceptable < 5; Kline, 2011; Marôco, 2010; Schumacker & Lomax, 2010), GFI (Goodness-of-fit index; GFI (Goodness-of-fit index, values close to .90 indicate a good adjustment, Jöreskog & Sörbom, 1982, Kline, 2011, Schumacker & Lomax, 2010), CFI (Comparative fit index; values close to .90 indicate a good fit; Jöreskog & Sörbom, 1982; Kline, 2011; Schumacker & Lomax, 2010), CFI (Comparative fit index; values> .90 are considered a good adjustment; Bentler, 1990) and RMSEA (Root Mean Square Error of Approximation, good fit <.05, acceptable fit <.08, Kline 2011; Schumacker & Lomax, 2010).

The model adjustment improvement was assessed by means of the modification indices (MI), and we considered liberating the parameters with higher MI (Bollen, 1989). Arbuckle (2013) suggestion regarding analysing IMs through their statistical significance was followed, considering the value of $\alpha = .05$. Another criterion used was based on Marôco (2010), who advises that it is safer to modify the parameters with MI higher than 11 ($p < .001$), although we have adopted a more demanding MI value, correlating only the errors between observed variables whose MIs were greater than 20 exclusively within each factor.

The verification of changes in the behavior of the structure based on teachers' gender was performed through invariance tests, according to the structural equation modeling methodology (Byrne, 2001). The starting point of the invariance test entailed the definition of a basic structural model. The graphical representation of the factorial

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structure of the W-F scale (base model) is reproduced in Figure 1 (with standardized regression coefficients and proportions of variance already explained due to space saving reasons), where there are six first-order factors and a large second-order factor (WFI and General WFF), all of them represented by ellipses. Rectangles represent the observed variables (items of each dimension), which are expressions of each factor respectively. The unidirectional arrows, starting from each factor and pointing to the items (observed variables) of the W-F Scale, indicate the effect of the responses on the items, that is, the latent factors underlie the set of questionnaire items. Smaller circles, also consisting of unidirectional arrows pointing to questionnaire items and first-order factors, represent unexplained variances (errors or disturbances) by the respective factors.
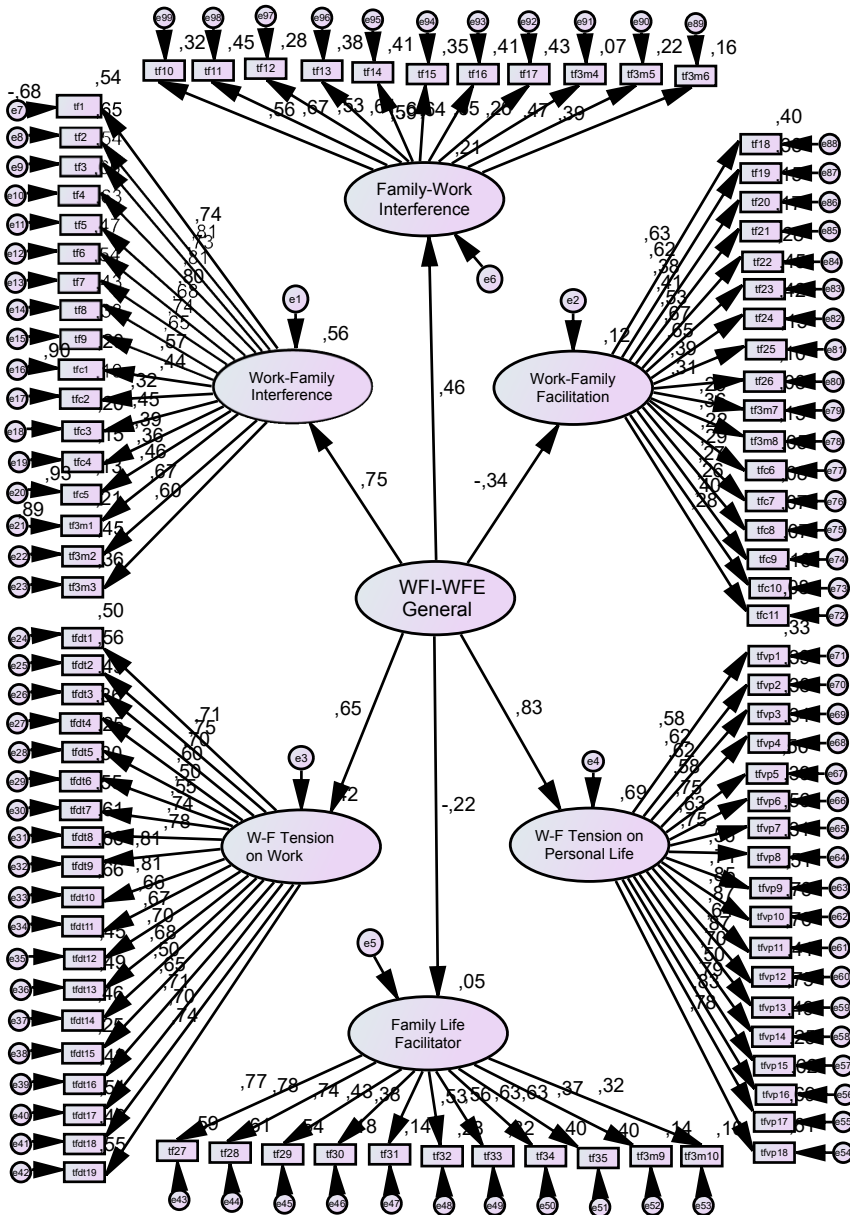
Once the basic structural model was defined (see Figure 1), the chi-square value, the degrees of freedom, and the fit of the model were determined.

In order to test the homogeneity of parameters for men and women separately, after having tested the overall model in both groups, we performed a multi-group analysis to determine if the factorial structure was invariant or variant in both sexes (estimation method by maximum likelihood). Measurement invariance was tested with the chi-square test ($\chi2$, Cochran, 1952), the most frequently used test to verify the overall fit of the model in samples considered with a normal distribution, even though it depends on the size of the sample (Yuan, 2005); both models were specified, parameters were estimated by the maximum likelihood estimation method, and the likelihood ratio was calculated and later compared through the $\chi2$ distribution (Cochran, 1952).

The sum of the chi-squared values obtained from the model adjustment process for each group separately reflects the extent to which the latent structure fits the data across the groups when there is no constraint imposed on the group (Byrne, 2001). Thereafter, model modifications were tested with the subgroups of interest (in this case, women and men) by progressively restricting the parameters of the model selected in the first step (free model) with the restricted models in order to test the invariance (Marôco, 2010). If the difference between the chi-squares of the tested and base models is statistically significant, we conclude that in that parameter the behavior of the model is variant. Thus, we tested the invariance for each dimension of the W-F scale, comparing each restricted model (global and by size) with the free multi-group model.

Results

Figure 1. Theoretical structural model of the Work-Family Scale (W-F) used in the analysis of invariance among university teachers (male and female): standardized regression coefficients and proportions of variance explained in each observed variable.

Source: The authors.

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The main quality adjustment indicators between the base model and the answers obtained from both groups of teachers (male and female) were estimated separately, and the same was done with the multi-group model (see coefficients estimated in Figure 1). The model's stricter proved to be well adjusted in the multi-group sample considering the χ^2 / gl and RMSEA indices (see Table 1), although it showed weaknesses in the GFI and IFC absolute fit quality indices, the latter being due to the high number of variables in the sample, among other factors (Marôco, 2010). In order to improve the model fit, within each factor, we established covariations between a set of errors based on IM > 20 and on the interpretive weighting, given the theoretical reference that resulted in the construction of the W-F scale. Covariation between errors could indicate systematic and non-random measurement errors and, in the case of this study, it is likely to be a result of semantic redundancies among items within each factor, associated with identical phrasing, in addition to the sample's characteristics, which should not be overlooked (Aish & Jöreskog, 1990). After establishing these covariations, the model's goodness of fit improved substantially, as shown in Table 1, in the line corresponding to the results of the multi-group analysis after covariation of the errors.

The analysis of the models generated for the men and women separately indicated low values (see Table 1, Female and Male models). The GFI and CFI values for both models presented unadjusted values, improving considerably after covariation of the errors (see Table 1, female and male models after covariation of errors).

Table 1. Work-Family scale base model goodness of fit indices.

Model	χ^2	gl	χ^2/gl	GFI	CFI	RMSEA
Female	11074.66*	4179	2.65	.524	.599	.075
Female after covarying the errors (IM > 20)	7347.97*	4126	1.78	.662	.789	.052
Male	10703.23*	4179	2.56	.535	.614	.072
Male after covarying the errors (MI > 20)	7231.34*	4125	1.75	.665	.794	.050
Multigroup	21777.92*	8358	2.61	-	.606	.052
Multigroup after covarying the errors (MI > 20)	14055.09*	8156	1.72	-	.806	.035

Caption: χ^2 = Chi-square; gl = degrees of freedom; GFI = Goodness-of-Fit Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation.

* $p < .001$.

Source: The authors.

Starting from an acceptable model fit, we performed the invariance test of the factors of the Work-Family scale, without correlating the errors based on the modification indices. Based on the non-restrictive base model, the chi-square (χ^2) of the

completely restrictive model was performed, which showed a significant difference ($p < .001$). These indicated differences between the structural models, meaning that progressively imposed restrictions do not remain the same between male and female teachers (see row 1 in Table 2).

Table 2. Work-Family Scale Invariance using the Chi-square test (χ^2): comparison of the global restrictive models and for each factor of the T-F scale with regard to the multi-group free model.

	χ^2	gl	$\Delta\chi^2$	Δgl	p	Conclusão
Restricted Model	22207.3	8544	429.381	186	.000	Variant
Factors:						
Restricted Model IWFSW	21821.893	8396	43.974	38	.233	Invariant
Restricted Model IWFSF	21820.121	8394	42.202	36	.221	Invariant
Restricted Model WFI	21858.131	8392	80.212	34	.000	Variant
Restricted Model FWI	21865.26	8380	87.341	22	.000	Variant
Restricted Model WFF	21879.611	8392	101.692	34	.000	Variant
Restricted Model FWF	21844.578	8380	66.659	22	.000	Variant

Caption: IWFSW: Impact of Work-Family Strain on Work; and IWFSF: Impact of Work-Family Strain on Family; WFI: Work-Family Interference; FWI: Family's Interference with Work; WFF: Work as Family Life Facilitator; FWF: Family as a Work Facilitator.

$\chi2$ = Chi-square; gl = degrees of freedom; $\Delta\chi^2$ = chi-squares difference between the base model and the tested models; Δgl = degrees of freedom difference between the base model and the tested models; p = significance level.

Source: The authors.

The invariance test was performed with the restrictive imposition on each of the factors separately, analyzing the invariance in both groups (see Table 2). Restrictions were made only for the intercepts of first-order factors, and the procedure for each individual variable was not performed (which justifies the small difference between degrees of freedom – Δgl). The results obtained from the models generated by the constraints were then compared with the non-restrictive base model, and a conclusion was drawn with regard to the (in)variance. It was noted that there was no difference in statistical significance between restrictive models, where the factors Impact of Work-Family Strain on Work (IWFSW) and Impact of Work-Family Strain on Family (IWFSF) were fixed, thus being invariant among teachers, regardless of gender (see Table 2). Regarding the restrictive models where the factors Work-Family Interference (WFI), Family's Interference with Work (FWI), Work as a Family Life Facilitator (WFF), and Family as a Work Facilitator (FWF) were fixed, differences were statistically significant, showing that these factors vary between sexes (see Table 2).

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Discussion

The purpose of this study was to explore the measurement invariance between sexes, in the different dimensions of the W-F Scale (Work-Family, adapted in an academic context by Carvalho & Peralta, in 2009, and later tested by Carvalho & Andrade, 2012; Carvalho et al., 2012; Carvalho et al., 2016a; Carvalho et al., 2016b) in higher education teachers from mainland Portugal and Islands, and in health professionals in Portugal. We found special motivation for carrying out this study after detecting that current literature reviews attempt to explain the complexity of the W-F relationship by the mechanisms of conflict (W-F) and worker's scarcity of resources (e.g., time), but there is a considerable lack of research when it comes to measurement invariance between sexes.

The invariance analyzes performed through the analysis of groups with structural equation models showed no measurement invariance regarding the W-F scale dimensions (WFI: Work's Interference with Family; FWI: Family's Interference with Work; WFF: Work as a Family-Life Facilitator; and FWF: Family as a Work Facilitator), showing variance in the structural model of the two subsamples under study. This result highlights the importance of not carrying out comparative studies with such dimensions for both sexes since they do not represent the same concepts in both groups. They, therefore, call for the cautious use of these four dimensions of scale, which relate to interference and work-family facilitation – as a result, therefore, comparative studies between men and women with these dimensions may lead to an interpretative bias regarding the obtained scores and their interpretation.

It should be noted, however, that current literature emphasizes the disadvantages of using the Chi-square test, given its sensitivity to sample size (in large samples, test results tend to be significant even for small differences between observed and specified covariance matrices). For example, Hayduk (1987) refers that in the case of samples with N > 500 participants the test tends to indicate noninvariance, and it is also sensitive to non-normality, specifically regarding kurtosis (Yuan, 2005). Due to these limitations, other methodologies have been proposed in the study of measurement invariance through multi-group analysis, testing configural, metric and scalar invariance, as well as full uniqueness invariance, by comparing the adjustment indices CFI, SRMR (standardized root mean square residual; Brown, 2015) and RMSEA (e.g., Cervo, Mónico, Santos, Hutz, & Pais, 2016), since they are neither affected by the size of the sample nor by the complexity of the model (e.g., Chen, 2007; Cheung & Rensvold, 2002; Meade, Johnson, & Braddy, 2008). For this reason, future research should consider testing the measurement invariance of the W-F scale using more recent methodologies. Moreover, we suggest carrying out an invariance test based on the Multidimensional Item Response Theory in further studies. It is also worth mentioning the possibility of performing a MIMIC model (multiple indicators and multiple causes), in order to obtain modification indices for individual items, using sex (male vs. female) as a covariant of the latent model.

Another aspect of the W-F scale to be improved is the detailed analysis of the items that constitute each dimension, given the high semantic redundancies among many of them. Future improvement of each dimension of the scale could help reduce the number of items and avoid redundancies. This would be possible considering the high levels of internal consistency obtained, due to the strong intercorrelations between the items within each dimension.

Much of the literature on the Work-Family relationship highlights the differences between the sexes essentially linked to the expectations associated with the roles played by both. Therefore, this may evidence conceptual differences that result in variance of measure in terms of the perception that men and women have regarding the dimensions of the W-F (Work-Family) scale. Men generally tend to assume more professional responsibilities, providing a stable income for the family and contributing to its well-being, though also being less available at home. In spite of being educated, emancipated, and an integral part of the workforce, women still tend to play the role of caretakers in the family sphere, often prioritising it over many of their professional aspirations, especially if they have children. In fact, it is generally women who manage children's daily lives, taking part in their hygiene, dressing, and transportation to and from school, as well as helping them with homework or managing their extracurricular activities, meals and bedtime.

Furthermore, differences among cultures in relation to work-family interference may support variance between men and women. People in individualistic societies tend to view work as a means of achieving success and personal development (Hofstede, 1980), showing differences in male and female profiles. Consequently, excessive efforts at work are a sign of self- devotion at the expense of the family, which seems to be particularly valued by women. On the other hand, people in collectivist societies tend to see individuals as part of a social network (Hofstede, 1980), work roles are considered to serve group needs and are therefore weighed against individual needs, enabling shared responsibilities between men and women. Those who strive in the work sphere are supported and praised for their effort in the interest of the group (such as the family) (Yang, Chen, Choi, & Zou, 2000; Yang, 2005), thus making the construct variant between men and women.

The invariant results between men and women regarding the dimensions Impact of Work-Family Strain on Work and Impact of Work-Family Strain on Family Life represent identical conceptions of these factors for men and women, reflecting safety in comparative evaluation between men and women, translated into a greater or lesser Impact of Work-Family Strain on Work and Impact of Work-Family Strain on Family Life. This will allow us, in the future, to reliably compare average scores from such dimensions. To a certain extent, we can also say that the representation of men and women in these dimensions echo their roles in society nowadays, largely due to changes in the "family" concept, followed by the emergence of adjusting responses from "family friendly businesses "or" family-owned businesses." What is more, there have

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also been efforts to create organizational and social policies to support families or to recognize equal work opportunities, career access, and growth. These facts lead to a similar representational setting for both men and women regarding the concepts that shape such dimensions. Thereby, similarities between men and women in terms of work-family and family-work interaction may reflect the emergence of the new so-called "non-traditional" family structures (e.g., single-parent families with children and relatives from other relationships – "my children, yours and ours," unemployed men, men benefiting from parental leave, Skype/Facebook or virtual families), in addition to social responsible businesses that increasingly offer work-family reconciliation policies to men and women, providing more quality of life at work, greater satisfaction with both career and life, and greater productivity and quality. These facts, along with the increasing participation of women in the labor market, seem to require men and women to share non-labor tasks, bringing close the requirements for both sexes/genders at home and at work. In fact, Portugal is one of the European Union countries with highest female labor market participation rates, and even women with small children are working full time. However, there are few known Portuguese family-friendly organizations (providing W-F supportive and reconciliation practices that address the real needs of both sexes.

Limitations and future research suggestions

In our view, there are two main limitations to this study. The first one is related to the extension of the W-F Scale, consisting of 92 items, which makes the process of answering the questionnaire very tiring and time-consuming. The other limitation concerns the way the questionnaire is administered. Although self-administered surveys have the advantage of anonymity and privacy respect, guaranteeing the internal validity of the study is usually a challenge (Alferes, 2012).

In addition to pointing out the need to carry out future research on the measurement invariance in all dimensions of the scale with other methodologies, it is necessary to investigate other variables such as the impact of personality on the work-family relationship, and the impact of W-F stress at different levels (personal and professional). Previous studies show that extroversion has a positive influence on this domain, facilitating work and family performance, though not being related to the conflict. In addition, neuroticism seems to show a strong relationship with conflict, since more conscientious individuals create less conflict, which results in better family-work outcomes (Wayne, Musisca, & Fleeson, 2004).

All things considered, it was concluded that the W-F scale is adequate to perform the comparative gender evaluation of the dimensions Impact of Work-Family Strain on Work and Impact of Work-Family Strain Family Life (invariant dimensions). However, this is not the case of dimensions related to Interference and Work-Family Facilitation (variant dimensions).

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