Peer-reviewed version available at J. Clin. Med. 2018, 8, 10; doi:10.3390/jcm8010010

Article

The mediating role of perceived stress in the relationship of self-efficacy and work engagement in nurses

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Abstract: Positive Occupational Health Psychology (POHP) examines the mechanisms that promote workers' health and wellbeing, in addition to risk factors arising from work activity. The aim of this study was to analyze the mediating role of perceived stress in the effect that self-efficacy has on *engagement* in nurses. The sample comprised 1777 currently working nurses. We administered the *Utrecht Work Engagement Scale (UWES),* the Perceived Stress Questionnaire and the General Self-Efficacy Scale. Following bivariate correlational analysis, multiple linear regression analysis, and simple and multiple mediation analysis the results showed Self-efficacy to be a powerful personal resource that positively predicts employees' *engagement*, although the effect diminishes when there are mediating variables of stress. We found differences in the way the different aspects of stress mediated the relationship between Self-efficacy and the *engagement* dimensions. "Energy–joy" was the strongest mediating variable for all of the *engagement* dimensions, and this, together with "harassment–social acceptance" dampened the effect of Self-efficacy on vigor and dedication, whereas "Overload" was only a mediator for dedication. Because nurses work in a stressful environment, risk factor arising from work activity, hospital management should design interventions to enhance their workers' personal resources and improve personal and organizational wellbeing.

Keywords: stress perceived; self-efficacy; engagement; work; nursing.

1. Introduction

Towards the end of the 20th century Occupational Health Psychology (OHP) appeared as a specialist area of psychology with the aim of "improving the quality of work life, and protecting and promoting the safety, health and wellbeing of workers." (National Institute of Occupational Safety and Health; NIOSH) [1]. Historically, psychology has been concerned with negative aspects of health; as Salanova & Schaufeli [2] put it, this discipline has been interested in the study of the 4 Ds (Diseases, Disorders, Damage and Disabilities) (e.g. burnout, mobbing, absenteeism in the

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workplace, musculoskeletal problems) [3]. The appearance of Positive Psychology led to greater interest in the positive aspects of human functioning [4,5]. This is the context of Positive Occupational Health Psychology (POHP), which arose from the concept of integrated health and Positive Organizational Psychology, concerned with "the scientific study of the optimal functioning of the health of individuals and groups in organizations, as well as the effective management of psychosocial well-being at work and the development of healthy organizations" [1] (p. 23).

From this perspective, POHP has paid particular attention to the study of engagement or organizational commitment, defined as "a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" [6] (p. 74). Vigor is characterized by high levels of energy, effort at work and persistence in the face of difficulties. Dedication refers to strong involvement in the job and having a sense of significance, pride and challenge in the work. Finally, absorption means fully concentrating and being immersed in the work, such that time passes quickly [7].

Engagement as a construct has been widely studied as it has been implicated in various positive results both for workers and organizations. It has been positively related with health [8], happiness [9] and satisfaction [10]. It has also been linked to behavior which is beneficial to the organization including personal initiative [11], active learning [12], proactive behavior such as job crafting [13], customer satisfaction [14], quality of service [15], individual performance [16] and organizational performance [17].

Since its inception, the Job Demands-Resources model (JD-R) [18] has been the reference framework for research into work related wellbeing and stress [19]. This model views job resources to be the best indicators of engagement of both individual and organizational performance via a motivational process [20]. The model also highlights the role of workers' personal resources defined as positive self-evaluation or belief of control the workers have over their environment because it is positively related to engagement and performance and it also reduces the negative impact of job demands [19,21].

In terms of personal resources, the literature has underlined the relationship of workers' "self-efficacy" with indicators of wellbeing and occupational health [22,23]. In Social Cognitive Theory (SCT) developed by Albert Bandura [24] it is defined as belief in their own abilities to organize and carry out courses of action needed to produce specific future successes. SCT supposes that beliefs of self-efficacy affect forms of behavior, thinking and feeling. For example, individuals tend to choose tasks that they feel capable of doing, avoiding tasks that are beyond their abilities; in addition, people who feel that they are not very effective in the face of the demands of their surroundings exaggerate their deficits, producing negative thoughts which leads to stress and makes it more difficult for them to use the resources available to them [25-28]. Much empirical research has looked at the role of self-efficacy in the context of work. It has shown that positive belief of self-efficacy predicts positive states such as *engagement*, through gain spirals, especially when the job is demanding [19,29]. Self-efficacy also performs a buffering role in the face of various job demands [30-32].

In the Job Demands-Resources model, "stress" is thought of as a demand in the context of work, one which can trigger a process of deterioration of worker health that may be reflected in various mood disorders (e.g. depression) and physical problems (e.g. musculoskeletal or cardiovascular issues) [33]. In fact, stress is one of the main objects of study for occupational health psychology as it is one possible precursor to *burnout* [20].

Our aim in this study was to evaluate the mediating role of stress in the effect self-efficacy has on engagement in a sample of nursing professionals. Nursing has been the subject of numerous studies due to its reputation for being a particularly stressful profession [34,35], but one of the strengths of our current work is the interest in wellbeing from the perspective of Positive Occupational Health Psychology (POHP).

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2. Materials and Methods

2.1. Participants

The sample in our study was made up of a total of 1777 active nursing professionals. The mean age of the participants was 32.02 (*SD*=6.69), ranging from 22 to 60 years old. Over four fifths (85.4%, *n*=1517) were women, and the remaining 14.6% were men, with mean ages of 32.01 (*SD*=6.63) and 32.10 (*SD*=7.01) respectively. Just over half (51.5%, *n*=916) of the participants were single, 46.1% (*n*=819) were married or in a stable relationship, 2.3% (*n*=40) were divorced or separated and 0.1% (*n*=2) were widowed. At the time of the study 71.6% (*n*=1273) were working under temporary contracts, and 28.4% (*n*=504) were working under permanent contracts.

2.2. Instruments

The *Utrecht Work Engagement Scale* (UWES) [7] is a self-reported scale for evaluating engagement *at* work. It contains 17 items with 7-point Likert type responses. It provides information about three aspects of engagement: Vigor, Dedication and Absorption. The scale gives a total *engagement* score and a score for each of the three individual dimensions. This instrument has achieved appropriate levels of reliability and validity [6]. In our sample of nurses, the indexes of internal reliability in each of the dimensions were excellent. The values were .84 for Vigor, .89 for Dedication and .81 for Absorption.

The *Perceived Stress Questionnaire* from Levenstein et al. [36] was designed specifically to measure stress in psychosomatic clinical research. The original version was made up of 30 elements in six scales: harassment–social acceptance, overload, irritability–tension–fatigue, energy–joy, fear–anxiety, and self-realization–satisfaction. In this case we used the Spanish adaptation of 11 items [33], which demonstrated a general reliability of .80 in a research sample of health workers and students. In our case, in the sample of nurses, the instrument gave a general reliability of .79. Cronbach's alpha index for the scales varied between .62 and .80.

The *General Self-Efficacy Scale* [37] is made up of 10 items with 4-point Likert type responses. It evaluates a person's perception of their personal competence to effectively manage different stressful situations. Authors such as [38] examined the reliability of the scale and obtained a Cronbach alpha of .87. In the current study, in the calculation of the scale's internal consistency, we obtained an alpha of .92.

2.3. Procedure

Once the evaluation instruments were selected, and before data collection, the participants in the sample were assured that the study would comply with appropriate standards of data retention, confidentiality and ethics in how the data would be treated. The study was approved by the Bioethics Committee at the University of Almería. The questionnaires were applied through a web platform which allowed each subject to complete their part online. In order to check for random or incongruent responses, we included a series of control questions which would detect those cases and highlight anyone in the sample who responded randomly.

2.4. Data analysis

This study is a quantitative descriptive design. This paper also includes valuable recommendations for the revision of Strengthening the Reporting of Observational studies in Epidemiology (STROBE) [39]. Firstly, the relationships between the variables were examined, by analysis of bivariate correlations. To understand the how the predictor variables (Self-efficacy; perceived stress: harassment–social-acceptance, overload, irritability–tension–fatigue, energy–joy, fear–anxiety, self-realization–satisfaction) related to the criterion variable (*Engagement*: Vigor, Dedication and Absorption), we carried out stepwise multiple linear regression.

To check the mediating effect of the variables in each of the regression models, we performed simple and multiple mediation analysis with three mediating variables (for each case the

independent variable was the variable with the greatest explanatory value in the regression model according to standardized coefficients, with the other variables included in the equation considered as possible mediators). The regression models were produced using the SPSS macro for simple and multiple mediation effects by Preacher & Hayes [40,41]. In addition, we applied the *bootstrapping* technique with coefficients estimated from 5000 bootstrap samples.

3. Results

3.1. Self-efficacy, perceived stress and engagement

As Table 1 shows, self-efficacy was positively correlated with the three *engagement* dimensions (Vigor: r=.51, p<.001; Dedication: r=.45, p<.001; Absorption: r=.38, p<.001) and was negatively correlated with most of the components of perceived stress (H-SA: r=-.19, p<.001; I-T-F: r=-.22, p<.001; E-J: r=.39, p<.001; F-A: r=-.29, p<.001; SR-S: r=-.11, p<.001).

Table 1. Self-efficacy, perceived stress and *engagement*. Bivariate correlations.

	1	2	3	4	5	6	7	8	9
1. Self-efficacy	–								
2. Harassment–social acceptance	-.19***	–							
3. Overload	-.02	.51***	–						
4. Irritability-tension-fatigue	-.22***	.69***	.66***	–					
5. Energy-joy	.39***	-.42***	-.32***	-.52***	–				
6. Fear-anxiety	-.29***	.55***	.47***	.69***	-.45***	–			
7. Self-realization–satisfaction	-.11***	.45***	.42***	.51***	-.14***	.50***	–		
8. Vigor	.51***	-.25***	-.09***	-.28***	.43***	-.26***	-.07**	–	
9. Dedication	.45***	-.29***	-.08***	-.28***	.43***	-.25***	-.03	.84***	–
10. Absorption	.38***	-.16***	-.04	-.18***	.30***	-.16***	-.01	.82***	.77***

**p< .01; ***p< .001

In the relationships between the *engagement* dimensions and the components of perceived stress, Vigor was positively correlated with energy–joy (r=.43, p<.001) and negatively correlated with the other stress factors (H-SA: r=-.25; p<.001; SOB: r=-.09, p<.001; I-T-F: r=-.28, p<.001; F-A: r=-.26, p<.001; SR-S: r=-.07, p<.01). Dedication was positively correlated with energy–joy (r=.43, p<.001) while being negatively correlated with: harassment–social acceptance (r=-.29; p<.001), overload (r=-.08, p<.001), irritability–tension–fatigue (r=-.28, p<.001), and fear–anxiety (r=-.25, p<.001). Finally, Absorption was also positively correlated with energy–joy (r=.30, p<.001) and negatively correlated with harassment–social acceptance (r=-.16; p<.001), irritability–tension–fatigue (r=-.18, p<.001), and fear–anxiety (r=-.16, p<.001).

3.2. Self-efficacy and components of perceived stress as predictors of engagement in nurses

Using the correlational analysis data, we performed multiple linear regression analysis with the aim of identifying the predictor variables in each case. Table 2 shows that for the *engagement* dimension of Vigor the regression analysis gave four models, with the fourth having the greatest explanatory power, with 33.6% (R^2=.33) of the variance explained by the factors included in the model. To confirm the validity of the model we analyzed the independence of the residuals. The Durbin-Watson D statistic gave a value D=1.97, which confirms the absence of positive and negative autocorrelation. In addition, the value of t is associated with a probability of error of less than .05 in all of the variables included in the model. The standardized coefficients show that the variable with greatest explanatory weight was self-efficacy. Finally, the values of the tolerance indicators and VIF indicate the absence of collinearity between the variables in the model.

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With Dedication, the regression analysis produced four models, with the final model explaining 30.6% (R^2=.30) of the variance. In this case the Durbin-Watson *D* statistic confirmed the validity of the model (*D*=1.93). The value of *t* suggests a probability of error of less than .05 for all of the variables in the model. The values of the standardized coefficients indicate that self-efficacy is the strongest predictor of Dedication in this sample. The values of the tolerance indicators and VIF indicate the absence of collinearity between the variables.

Table 2. *Engagement* dimensions. Stepwise multiple linear regression model (*N*=1777).

	Model	*R*	R^2	Corrected R^2	Change statistics: Typical error of estimation	Change statistics: Change in R^2	Change statistics: Change in *F*	Change statistics: Sig. of change in *F*	Durbin Watson
VIGOR	1	.51	.26	.26	.65	.26	635.29	.000	1.97
	2	.57	.33	.32	.62	.06	175.51	.000	
	3	.57	.33	.33	.62	.00	11.39	.001	
	4	.58	.33	.33	.62	.00	6.24	.013	

	Model 4	Non-standardized coefficients: *B*	Non-standardized coefficients: Std Error	Standardized coefficients: Beta	*t*	Sig.	Collinearity: Tol.	Collinearity: VIF
	(Constant)	.85	.16		5.22	.000		
	Self-efficacy	.06	.00	.40	19.12	.000	.84	1.19
	Energy-Joy	.31	.02	.24	10.73	.000	.71	1.40
	H'ment-Soc.Accpt.	-.18	.04	-.09	-4.13	.000	.66	1.51
	S-realization–Satisf.	.10	.04	.05	2.49	.013	.78	1.27

	Model	*R*	R^2	Corrected R^2	Change statistics: Typical error of estimation	Change statistics: Change in R^2	Change statistics: Change in *F*	Change statistics: Sig. of change in *F*	Durbin Watson
DEDICATION	1	.45	.20	.20	.70	.20	469.37	.000	1.93
	2	.53	.28	.28	.66	.07	196.62	.000	
	3	.54	.30	.29	.66	.01	29.95	.000	
	4	.55	.30	.30	.66	.00	15.24	.000	

	Model 4	Non-standardized coefficients: *B*	Non-standardized coefficients: Std Error	Standardized coefficients: *B*	*t*	Sig.	Collinearity: Tol.	Collinearity: VIF
	(Constant)	1.48	.16		8.85	.000		
	Self-efficacy	.05	.00	.32	14.67	.000	.82	1.21
	Energy-Joy	.36	.03	.27	11.52	.000	.69	1.44
	H'ment-Soc.Accpt.	-.31	.04	-.16	-6.65	.000	.65	1.51
	Overload	.12	.03	.09	3.90	.000	.70	1.41

	Model	*R*	R^2	Corrected R^2	Change statistics: Typical error of estimation	Change statistics: Change in R^2	Change statistics: Change in *F*	Change statistics: Sig. of change in *F*	Durbin Watson
ABSORPTION	1	.38	.15	.15	.72	.15	314.64	.000	1.95
	2	.42	.17	.17	.71	.02	61.37	.000	

	Model 2	Non-standardized coefficients: *B*	Non-standardized coefficients: Std Error	Standardized coefficients: *B*	*t*	Sig.	Collinearity: Tol.	Collinearity: VIF
	(Constant)	1.07	.12		8.44	.000		
	Self-efficacy	.05	.00	.31	13.47	.000	.84	1.18
	Energy-Joy	.24	.03	.18	7.83	.000	.84	1.18

Finally, for Absorption, the regression analysis produced two models with the second explaining 17.9% of the variance (R^2=.17) and a *D* statistic of *D*=1.95, which confirms the validity of the model. The value of the *t* statistic suggests an association between the variables with a probability of error of less than .05 for all of the variables in the model. Again, self-efficacy was the strongest predictor of this *engagement* dimension. The values of the tolerance indicators and VIF indicate the absence of collinearity between the variables in the model.

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3.3. Mediation models for the estimation of predictors and routes of mediation effects for engagement dimensions

Following the regression analysis, self-efficacy was identified as the independent or predictor variable and the other variables included in the model as mediating variables. Three mediation models were generated, each with self-efficacy as the independent variable. In the first, with Vigor as the dependent variable a multiple mediation model was examined with three mediating variables (M_1: E-J, M_2: H-SA, and M_3: SR-S). The second, predicting mediating effects on Dedication, included three mediating variables (M_1: E-J, M_2: H-SA, and M_3: SOB). The third, with Absorption as the dependent variable, was a simple mediation analysis with a single mediating variable (M_1: E-J).

Figure 1 shows the multiple mediation model for Vigor, including direct, indirect and total effects. There is a statistically significant effect [B=.05, p<.001] of self-efficacy (X) on energy–joy (M_1). The second regression analysis, with mediator 2 as the outcome variable, includes the variables self-efficacy (X) and energy–joy (M_1). Energy–joy has a significant effect [B=-.28, p<.001] on harassment–social acceptance (M_2), which is not the case with self-efficacy [B=-.002, p=.21]. With the third regression analysis, taking self-realization–satisfaction (M_3) as the outcome variable, we can estimate the effect of the independent variable and the effects of the other two mediators. In each case we see significant effects: self-efficacy [B=-.005, p<.01], energy–joy [B=.06, p<.001], and self-realization–satisfaction [B=.48, p<.001]. In addition, self-efficacy [B=.06, p<.001], energy–joy [B=.31, p<.001], harassment–social acceptance [B=-.18, p<.001] and self-realization–satisfaction [B=.10, p<.001] have significant effects on Vigor (Y). The overall effect of self-efficacy on Vigor is significant [B=.08 p<.001]. Finally, an analysis of indirect effects, via *bootstrapping*, produced data supporting significance for route 1 [ind$_1$: X→M_1→Y; B=.016, SE=.002, 95% CI (.012, .021)], and route 4 [ind$_4$: X→M_1→M_2→Y; B=.002, SE=.008, 95% CI (.001, .004)].

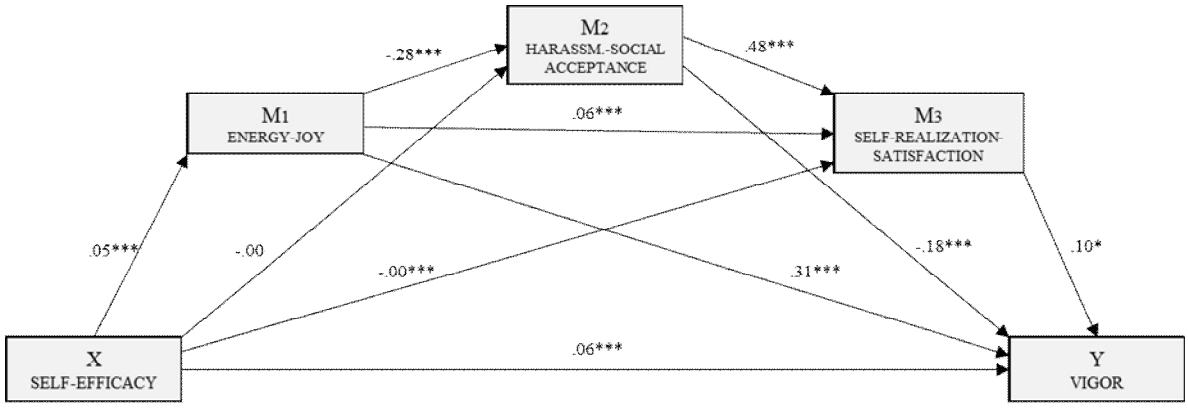

Figure 1. Multiple mediation model of perceived stress in the relationship between self-efficacy and the *engagement* dimension, Vigor.

Figure 2 shows the multiple mediation model for Dedication. Following the third regression analysis, with overload as the outcome variable (M_3), we estimated the effect of the independent variable and the other mediators. In each case we saw significant effects: self-efficacy [B=.01, p<.001], energy–joy [B=-.18, p<.001], and harassment–social acceptance [B=.63, p<.001]. Furthermore, self-efficacy [B=.05, p<.001], energy–joy [B=.36, p<.001], harassment–social acceptance [B=-.31, p<.001] and overload [B=.12, p<.001] have significant effects on Dedication (Y). The overall effect of self-efficacy on Dedication is significant [B=.07 p<.001].

The analysis of indirect effects, via *bootstrapping*, produced data which support a level of significance for route 1 [ind$_1$: X→M_1→Y; B=.018, SE=.002, 95% CI (.014, .024)], route 3 [ind$_3$: X→M_3→Y; B=.002, SE=.008, 95% CI (.001, .004)] and route 4 [ind$_4$: X→M_1→M_2→Y; B=.004, SE=.001, 95% CI (.002, .006)].

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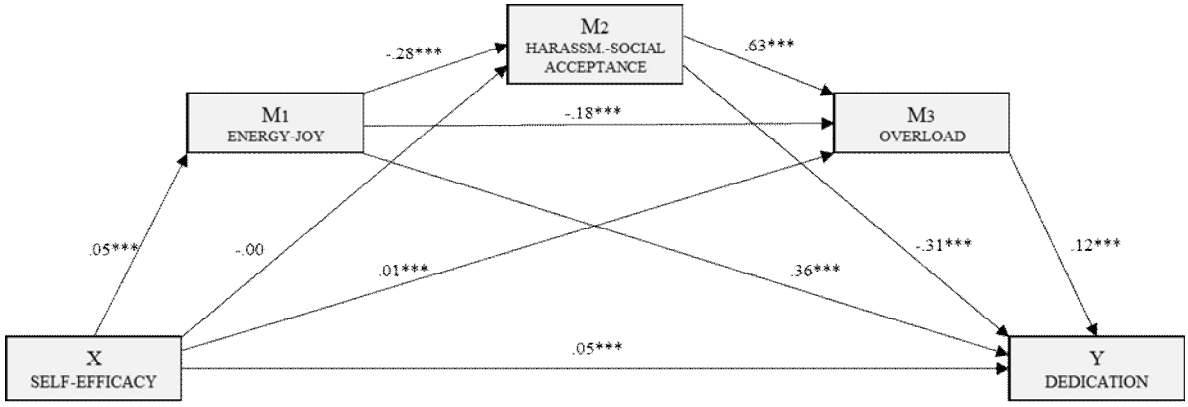

Figure 2. Multiple mediation model of perceived stress in the relationship between self-efficacy and the *engagement* dimension, Dedication.

Figure 3 shows the simple mediation model for Absorption. In the first regression analysis, energy–joy (M) was the outcome variable and the effect of self-efficacy was shown to be significant [B=.05, p<.001]. With the following regression analysis, with Absorption as the outcome variable (Y), we estimated the effects of the independent variable [B=.05 p<.001] and the mediator [B=.24 p<.001], which were both significant. The overall effect of self-efficacy on Absorption was significant [B=.06 p<.001].

The analysis of indirect effects via *bootstrapping* gave a significant effect [B=.01, SE=.002, 95% CI (.008, .017)].

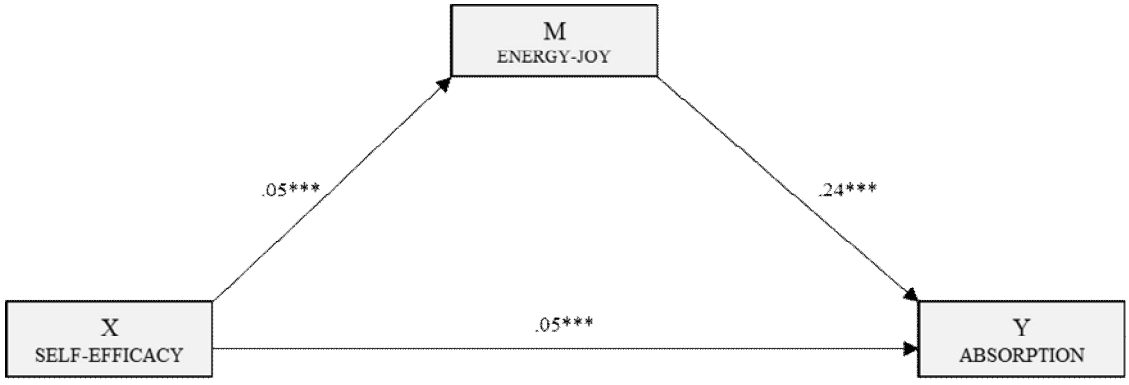

Figure 3. Simple mediation model of perceived stress in the relationship between self-efficacy and the *engagement* dimension, Absorption.

4. Discussion

With the appearance of Positive Occupational Health Psychology (POHP) the scientific and academic arena has shown greater interest in the study of the mechanisms which lead to sustainable work-related wellbeing for employees [1,4]. Nurses in particular have been the object of study in much empirical research as it is considered to be a very stressful profession, carried out in a particularly challenging environment in emotional and psychological terms [34,35].

In line with previous research [19,29], the three dimensions of *engagement* (Vigor, Dedication and Absorption) are positively correlated with Self-efficacy. We also found negative correlations between most of the components of stress and Self-efficacy and with *engagement*. In terms of the Job Demands-Resources model, authors such as Bakker et al. [20] indicate that, while Self-efficacy may cushion "stress", it is a job demand that may trigger a process of deterioration in workers' health, in addition to being a possible precursor of *burnout* [19,21].

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Our results confirm previous research indicating that Self-efficacy is the strongest predictor for all of the dimensions of *engagement* [19,20]. Self-efficacy beliefs determine our manner of perceiving the work environment in such a way that workers who believe themselves to be effective face challenging workplace demands with effort and perseverance, and do not consider failures as indicators of their worth [27].

Our data also indicate that the effect of Self-efficacy on all of the dimensions of *engagement* is greater when the relationship is direct, and that it diminishes significantly when there are mediating variables of stress. This confirms a partial mediation model.

We found differences in terms of the variables which mediate the relationship between Self-efficacy and the different aspects of *engagement*. "energy–joy", referring to aspects of wellbeing and health [33] is the strongest mediating variable for all of the *engagement* dimensions. With a smaller effect, "energy–joy" together with "harassment–social acceptance" are the mediating variables for Vigor and Dedication dimensions. Finally, "Overload" only appears as a mediator in the relationship between Self-Efficacy and Dedication.

The results of our work may have significant practical implications. It is important to highlight the significant effects of Self-efficacy on worker and organizational wellbeing, on the promotion of organizational commitment, and improving the quality of services, among other issues [22]. Organizations should implement *workshops* to improve their workers' personal resources and develop positive interventions to improve job satisfaction, with the aim of enhancing employee health [1].

This work is not without limitations, which should be borne in mind when considering the results. Firstly, the data was gathered by self-reporting, which may mean contamination by common method variance. It would be useful to complement these results with other measures gathered by other methods. Secondly, the results are not generalizable to the health field as a whole, so it would be interesting to widen the sample with other healthcare professionals. Finally, the transversal design of the study does not allow causal relationships to be established between variables, it would be advisable to perform longitudinal studies.

5. Conclusions

The main objective of our study was to evaluate the mediating role of stress in the relationship between Self-efficacy and *engagement* in nurses. This research has demonstrated that the strength of the relationship between Self-efficacy and *engagement* diminishes when there are stress-related mediating variables. One of the most important findings in our study is that, while there are differences in terms of the components of perceived stress which mediate the relationship between Self-efficacy and aspects of *engagement*, "energy–joy2 is the strongest mediating variable for Vigor, Dedication and Absorption.

This research contributes to the understanding of the importance of Self-Efficacy in the framework of Positive Occupational Health Psychology (POHP), as it deals with a personal resource which acts as a buffer against job demands and which significantly influences workers' wellbeing and occupational health.

Future lines of work should continue to explore the topic. It would be interesting to include other personal resources (e.g. self-esteem) and other aspects related to job demands (e.g. role conflict), and others risk factors arising from work activity. The mix of variables should be widened to include aspects related to job resources (e.g. leadership) to complete the structure of the Job Demands and Resources model and thus offer better understanding of wellbeing at work.

Author Contributions: M.C.P.F., M.M.M.J., A.B.B.M., M.M.S.M., J.J.G.L., and A.M.M. contributed to the conception and design of the review. J.J.G.L. applied the search strategy. All authors applied the selection criteria. All authors completed the assessment of risk of bias. All authors analyzed and interpreted data. M.M.M.J., M.C.P.F., A.B.B.M., and A.M.M. wrote this manuscript. M.M.M.J., M.C.P.F. and J.J.G.L. edited this manuscript. M.C.P.F. is responsible for the overall project.

Funding: This research received no external funding.

Acknowledgments: The present study was undertaken in collaboration with the Excma. Diputación Provincial de Almería. Part of this work has been developed thanks to the financing of University Teaching Training in Deficit Areas, Gerty Cori Aid, for the help for the hiring of research staff in predoctoral training, granted by María del Mar Simón Márquez.

Conflicts of Interest: The authors declare no conflict of interest.

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