Design and validity of a questionnaire for measuring psychosocial risk factors and burnout

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Abstract
In recent years, burnout has emerged as one of the most important work risks. Continuous chronical emotional and interpersonal stressors at the workplace can lead to burnout. Among those, psychosocial risk factors are things, events, or circumstances that may affect workers' health due to their work and workplace conditions and may result in burnout. The purpose of this research was to design and validate a scale to evaluate the relationship between psychosocial risk factors and burnout within the aerospace manufacturing industry. A reliable, valid scale was obtained, which can be applied to operative personnel.

Keywords: burnout; psychosocial risk factors; scale.

Diseño y validación de un instrumento de medición de factores psicosociales de riesgo asociados al desgaste laboral

Resumen
El síndrome de desgaste laboral se reconoce como uno de los riesgos emergentes más importantes en los sitios de trabajo. Dentro de los factores que contribuyen a su desarrollo, están los psicosociales, que son hechos, acontecimientos, situaciones o estados que derivan de la organización del trabajo y tienen una alta probabilidad de afectar a la salud del empleado con consecuencias destacables. Esta investigación tuvo como propósito diseñar un instrumento que permitiera medir la relación que existe entre los factores de riesgo psicosocial y el desgaste laboral, en el entorno de la industria aeroespacial de manufactura. Se obtuvo un instrumento de medición fiable y válido que puede ser aplicado a trabajadores de nivel operativo.

Palabras clave: desgaste laboral; factores de riesgo psicosocial; instrumento de medición.

1. Introduction

To this day, one of the most studied phenomena in companies is the way in which workers experience and respond to labor demands; particularly, in the last 30 years research has focused on work burnout [1]. The term "burnout" was first used in 1974, by psychiatrists Herbert Freudenberger and Christina Maslach who began to spread the concept at the annual congress of the American Psychologists Association in 1977 [2]. In recent years, it has been classified as one of the most significant emerging hazards in the workplace, in the category of psychosocial risks, along with work stress, psychological harassment (mobbing) and other forms of violence, which are known as global issues affecting all countries, professions and workers because of their impact on workers' health, performance and attendance [3].

1.1. Work related burnout

Burnout, also known as professional, occupational or emotional exhaustion syndrome [2], is not just a situation or event that occurs within the company or workplace, as for example, violence or harassment, but the result of a process

of chronic labor and organizational stress that ends in a state of emotional distress and demotivating fatigue for the performance of tasks [4]. It is a response to constant emotional and interpersonal stressors that occur at work, and are maintained over time, and it is defined from three dimensions: exhaustion, cynicism and inefficiency [5]. The three components of the syndrome are seen as a line of consequences that start with exhaustion [4]: at first, the workers' performance surges as work demands, pressures and load start to increase. Which may be positive up to a certain point; however, when the peak passes, the pressure becomes negative or stressful, performance declines and the long-term result is burnout [3].

1.2. Psychosocial risk factors

Some of the main issues that contribute to its development are psychosocial risk factors, which are facts, events, situations or states that arise from the work organization and may potentially affect the worker's health with major consequences [4]. Seen from a broader perspective, psychosocial risks refer to the potential of psychosocial threats of causing harm as well as major economic implications at the social level affecting companies of all types and sizes [6]. Unlike physical hazards, which are directly observable and measurable, psychosocial risks are the product of social interactions, and cannot be understood outside their context [7]. Some of the psychosocial factors associated with work burnout are: new hiring schemes and job insecurity, aging of the workforce, task intensification, high emotional demands at work, poor work-life balance, long shifts, higher workloads, poor salary and promotion prospects, ambiguous roles, and time and cost pressures that increase the risk of errors or compromise ethical and quality standards [8,9].

1.3. Measuring work burnout

There are several instruments to measure work burnout that have been widely used by companies and with results reported by literature; Table 1 shows three of the most used [10]. However, none of these scales concurrently measure work burnout and the psychosocial risk factors associated with it, so there is a need to develop such a survey; particularly, one that focus on operative level personnel in the aerospace manufacturing industry.

Table 1
Work burnout measurement instruments.

Name of the scale	Content
Burnout measure o BM [1]	Burnout: physical, emotional and mental exhaustion
Copenhagen burnout inventory or CBI [11]	Burnout: fatigue and exhaustion
Maslach burnout inventory or MBI [5]	Burnout: emotional exhaustion, depersonalization and low personal achievement (also known as: exhaustion, cynicism and professional competence)

Source: [10]

The purpose of this work is to show the design and validation of a scale that measures the perception of operational level workers in the aerospace manufacturing industry regarding psychosocial risk factors linked to work burnout.

2. Materials and method

2.1. Instrument design

The instrument design was conducted through a literature review from the research databases where psychosocial factors identified risks affecting workers' occupational health and quality of life. For the search, two tools were used: Google Scholar and the Meta-searcher of the Library at the Universidad Autónoma de Baja California. Key words were health hazard, job hazard, work hazard, psychosocial factor/risk, psychological factor/risk, social factor/risk, human factor, occupational hazard, manufacturing environment. In the case of Google Scholar, the key words concatenated in phrases such as: "Psychological factors in manufacturing", "psychosocial factors and health hazards in manufacturing", "work hazards in manufacturing". In the case of the Metasearch engine, logical search connectors were used, allowing to join several terms by conjunction (AND), disjunction (OR) and exclusion (NOT). The articles were limited to the period from 2012 to 2017 and articles from arbitrated academic publications took preference. The pre-selection was made through the title and summary of the article. In the first instance, medical articles related to symptoms and palliative or corrective treatment, health conditions not associated with the work environment such as HIV/AIDS and those dealing with psychosocial risk factors in environments other than the workplace were discarded, such as those focused on teenagers or infants. From this first selection, 189 articles were obtained. In this group of studies, a detailed review was conducted to the introduction section of each article and the results reported by the authors. Articles that showed links between working conditions and effects on workers' health were selected, an those making a differentiation by sex were discarded, given that the approach is of general interest and not specific. Once the process was completed, 70 studies were obtained, with specific information on 55 factors that impact health and working conditions. Next, these factors were grouped by their definition, resulting in 10 categories that are shown in Table 2. The table also shows the number of articles that referred to each category of identified psychosocial factor, as well as the cumulative percentage. As shown, workload imbalance had the highest number of mentions in literature, with 63 (19%); the second place, with 57 (17%) references, corresponded to lack of empowerment and the third was poor interpersonal relationships, with 53 (16%).

Categories that represented 80% of the mentions in articles were selected. As shown in Table 2, these include: workload imbalance, lack of empowerment, poor interpersonal relationships, insufficient rewards, role conflict and ambiguity, and uncertainty about new labor schemes;

Table 2.
Psychosocial factor categories reported by literature.

Psychosocial factor category	Number of articles	Percentage	Cumulative percentage
Workload imbalance	63	19%	
Lack of empowerment	57	17%	36%
Poor interpersonal relationships	53	16%	51%
Insufficient rewards	37	11%	62%
Role conflict and ambiguity	33	10%	72%
Uncertainty about new labor schemes	28	8%	80%
Lack of work-life balance	23	7%	87%
Unfitting work environment	18	5%	92%
Discrimination	14	4%	96%
Physical hazards	12	4%	100%
Total mentions	338		

Source: Statistics based on the literature review made by the authors

leaving out: lack of work-life balance, unfitting work environment, discrimination and physical hazard.

2.2. Conceptual definition of constructs

In order to form a theoretic basis for the operationalization, conceptual definitions for each of the constructs were developed. These are shown in Table 3.

2.3. Operationalization of the instrument

For the operationalization process, we identified 6 other instruments associated with psychosocial factors of interest: the one prepared by the Mexican Ministry of Labor and Social Welfare (STPS) described in NOM-STPS-035-2018 [17]; the FPSICO, by the National Institute of Occupational Health and Safety of Spain (INSHT) [18]; the instrument by the British Health and Safety Executive (HSE) [19]; the Copenhagen Psychosocial Questionnaire (COPSOQ)

medium version [20]; and the Karasek demand-control model questionnaire (JCQ) [21]. For measuring work burnout, the Maslach Burnout Inventory [MBI] was used [5]. From all these instruments, 80 items were adapted and subsequently validated. Table 4 shows the operationalization for each item and its associated variable. The design of the measuring instrument proposed, for its empirical application, the evaluation of the items of each construct from a Likert type scale, ranging from totally disagree (1), to totally agree (5).

2.4 Validating the measurement instrument

The validation process occured in two stages: validating the content through the method proposed by Lawshe [22] and standardized by Tristán-López [23]; and determination of reliability by empiricaly testing the survey on a pilot sample and using Chronbach's Alfa calculation on the results obtained.

2.4.1. Content validation

To verify if the items were suitable to measure the subject matter, the method proposed by Lawshe [22] was used. This methodology consists in gathering the opinions of an expert panel about the variables to be validated. Tristán-López [23] standardized this technique allowing the validation to be independent of the number of judges. The questionnaire was emailed to 18 potential judges during the month of June 2018 and 8 responses were obtained by August of that same year. The expert's qualifications are shown in Table 5, which also shows that 62.5% of respondents were women, the most common level of education was a doctorate (62.5%) and the main areas of expertise were Psychology and Health and Safety (37.5% in both cases).

Table 3
Conceptual definition for constructs of interest.

Construct	Conceptual definition
Workload imbalance	Workload imbalance may occur due to overwork, but also due to the opposite circumstance, that is, a low workload; labor demands are independent of the nature of the workload (quantitative, emotional) but are mostly associated with task intensity and time pressures [12,13].
Poor interpersonal relationships	Poor interpersonal relationships are characterized by the lack of social support in the company [coming from colleagues and supervisors], poor leadership, inadequate management style and social isolation [8,12-15].
Lack of empowerment	Lack of empowerment includes low participation in decision-making, and lack of control over work, not only regarding professional skills and expertise, but also in the organizational context of work activities [10,12].
Insufficient reward	An employee's reward for their work is considered insufficient when there is no reciprocity before a considerable amount of work effort that could be reflected in lack of promotions, low social value of the work, low income and lack of professional training and education opportunities [4,10,16].
Role conflict and ambiguity	Role conflicts occur when there are contradictory demands at the workplace, that may pose professional or ethical concerns; it may also happen when workers have not been properly informed about the tasks that they have to perform, their goals, resources to use and the autonomy that they have at work [13].
Uncertainty about new labor schemes	Uncertainty about new labor schemes is defined as a concern about the future regarding undesired changes in the fundamental labor conditions at the workplace (lean manufacturing, six sigma). This circumstances along with the aging workforce may produce a sentiment of job insecurity and fear of dismissal [8,13].
Work burnout	Work burnout is a syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment that can occur among individuals who work with people in some capacity [4,5].

Source: The Authors

Table 4
Operationalization for each item

Item		Observable variable
Workload imbalance		
At my workplace:		
CL1	I must work non-stop [17]	Work intensity
CL2	I must work very fast [17-21]	Work rhythm
CL3	I have goals that are impossible to achieve [19]	Quantitative demands
CL4	Deadlines are unattainable [19]	Unattainable deadlines
CL5	It is common for me to be interrupted while I'm working [18]	Interruptions
My job:		
CL6	It is physically very demanding [17]	Physical demands
CL7	It requires a lot of mental effort [17, 18, 20]	Mental effort
CL8	It is very repetitive [18, 21]	Monotonous work
Due to the excessive amount of work I have:		
CL9	It is common for me to work overtime, on weekends or holidays [17, 18]	Overtime
CL10	The time I have to correctly do my job is insufficient [18, 20, 21]	Insufficient time
Poor interpersonal relationships		
My co-workers:		
RI1	Hinder the correct performance of my tasks [17, 18, 21]	Lack of civility
RI2	Are not cooperative when I need it [17, 19, 20]	Lack of team cooperation
RI3	Make me feel like I'm not a part of the group [17, 20]	Lack of inclusion in the group
RI4	Are not friendly [21]	Lack of social support of co-workers
My supervisor:		
RI5	Shows little interest in their subordinates [21]	Lack of the supervisor's interest in workers
RI6	Solves conflict inefficiently [20]	Inefficient conflict resolution
RI7	Lacks the ability to get their subordinates to cooperate [21]	Inability to get cooperation from subordinates
At work, frequently:		
RI8	There are conflicts between employees [18]	Conflict between co-workers
RI9	Relationships between people are tense [19]	Tense relationships between co-workers
Lack of empowerment		
At work:		
EM1	Most decisions affecting my tasks are made by other people [18, 20, 21]	Lack of participation in decision-making
EM2	Other people determine my work procedures [18, 19, 21]	Lack of participation in task design
EM3	Other people schedule my work tasks [18]	Lack of participation in task scheduling
EM4	Others determine performance standards [17, 18]	Inadequate performance measurement
EM5	Others determine when I can take breaks [17, 19, 20]	Lack of participation in break scheduling
EM6	My ideas and contributions are discarded when there are changes [17, 18]	Lack of participation in decisions about changes
EM7	When there are problems, others make decisions to solve them [18]	Lack of participation in problem solution
In my work area I am not allowed to:		
EM8	Organize my tasks in a way I think is best [17, 18, 20]	Lack of participation in task organization
EM9	Set up my workstation in the way I think is best [18]	Lack of participation in the workstation setup

Item		Observable variable
EM10	Participate in restructuring or reorganization of the work area [18]	Lack of participation in restructuring of the work area
Insufficient rewards		
At work:		
R1	It is difficult to aspire to a better position [17, 18, 20]	Lack of opportunities of promotion
R2	Payment I receive is insufficient [17, 18]	Insufficient salary
R3	The tasks I do are irrelevant [18, 20]	Perception of task irrelevance
R4	It is difficult to develop my professional skills [17, 20, 21]	Lack of development of professional skills
R5	I am treated unfairly [20]	Unfair treatment
R6	I don't have opportunities to train for my position [17, 18]	Lack of opportunity for training
Generally, my work:		
R7	Is hardly recognized by my superiors [18, 20]	Little recognition by supervisors
R8	Is underappreciated by my superiors [18]	Lack of work appreciation by supervisors
R9	Is hardly recognized by my co-workers 18, 19]	Lack of recognition by colleagues
R10	It is underappreciated by my co-workers [18, 19]	Lack of work appreciation by co-workers
In general:		
R11	Recognition I get for my work is insufficient [18, 20]	Poor recognition
R12	I consider that I lack training to fulfill what my position requires 17, 18, 21]	Lack of training
Role conflict and ambiguity		
In the company I work at I need:		
AR1	To be clearly informed about my duties [17-20]	Lack of explanation of duties
AR2	To be clearly informed about the results I have to obtain [17]	Lack of clarity about expected results
AR3	To be clearly informed about the importance of my job being done correctly [18]	Lack of clarity on the job importance
AR4	To know who I can turn to if I have a problem [17]	Role ambiguity – search for help
AR5	To understand how my job affects the general goals of the company [19]	Lack of understanding about the job impact
AR6	To be clear on the objectives and goals of my department [17, 19, 20]	Lack of clarity on objectives and goals
AR7	To be informed ahead of time about the changes that might affect my work future [20]	Insufficient time to inform about changes
AR8	Motivation to feel committed to my job [20]	Poor motivation
AR9	To know how my job helps solve problems [18]	Lack of clarity about their place in the company
AR10	That my tasks are carefully planned [20]	Poor task planification
Uncertainty about new work schemes		
In my job:		
NE1	There are tasks that I cannot do because of the lack of resources (like tools, materials) [18]	Little access to resources
NE2	There is little work stability [17]	Job instability
NE3	I constantly have changes that I don't like (new tasks or responsibilities) [18, 20]	Frequent and unpleasant changes in tasks or responsibilities
NE4	There is constant job rotation [17]	Constant job rotation
NE5	It is possible that my tasks will change without my say [20]	Lack of say to change activities

NE6	My work Schedule changes without my say [20]	Lack of say in schedule change
NE7	Over the years, my job has become more demanding [12]	Job intensification
NE8	I have to make decisions that I disagree with [18]	Disagreement in decision-making
I am concerned that:		
NE9	Because of my age, it will be hard for me to find another job in case I lose this one [20]	Concern about dismissal due to aging
NE10	Because of my age, it's hard for me to get new skills [18]	Concern about difficulty in learning new skills due to aging
Work burnout [5]		
Because of my job:		
DL1	I am emotionally exhausted	Emotional exhaustion
DL2	I feel frustrated	Frustration
DL3	I feel exhausted	Fatigue
DL4	I am tired when I wake up in the morning and have to go to work.	Physical exhaustion
DL5	I feel tense during the day	Psychological exhaustion
From some time now:		
DL6	I have lost enthusiasm for my job	Work disenchantment
DL7	I doubt about my job transcendence	Hesitation about transcendence of work
DL8	I doubt about my job's value	Hesitation about the value of the work
DL9	I have lost interest in my job	Loss of interest
DL10	I have become cynical about my job's transcendence	Cynicism regarding transcendence
DL11	I have become cynical about my job's value	Cynicism regarding value
DL12	I feel apathy regarding my work	Work apathy
I am incapable of:		
DL13	Efficiently solving problems that arise at my job	Inability to solve problems
DL14	Contribute effectively to my organization	Inability to contribute to the company
DL15	Performing properly in my position	Inability to perform properly in the position
DL16	Reaching the goals of my job	Inability to reach goals
DL17	Accomplish valuable things in this position	Inability to generate value
DL18	Efficiently accomplish the tasks that are assigned to me	Inability to accomplish tasks

Source: The Authors

Table 5
Descriptive statistics of the experts validating the instrument.

		Frequency	Percentage
Gender	Male	3	37.5%
	Female	5	62.5%
Education	Bachelor's degree	3	37.5%
	Doctorate	5	62.5%
Area of expertise	Occupational health	1	12.5%
	Psychology	3	37.5%
	Sociology	1	12.5%
	Health and Safety	3	37.5%

Source: The Authors

Each expert evaluated the items in three categories: essential (1), useful but not essential (2) and not necessary (3). The Content Validity Ratio (CVR) was calculated from the experts' answers. This indicator is determined dividing the number of agreements on the essential category, by the number of participating judges. Results must provide at least 58.23% (0.5823) of agreements to be acceptable; eq. (1) demonstrates the calculation [23].

$$CVR' = \frac{n_e}{N} \qquad (1)$$

Where:
ne = number of experts that agree on the "essential" category
N = total number of experts

According to the criteria above, 73 items had a value greater than the minimum cut-off point and 7 had to be eliminated for not reaching this value. The list of eliminated items by construct is shown in Table 6.

Then, the Content Validity Index (CVI) was calculated. The CVR values of the acceptable items were added, and the result was divided by the total number of acceptable items, as shown in eq. (2). The lower threshold for the CVI, similar to the CVR's, is 0.5823 [23]; the index calculated for the instrument was 0.79, which is greater than the threshold. Therefore, it was determined that the instrument was within the acceptable range.

$$CVI = \frac{\sum_{i=1}^{M} CVR_i}{M} \qquad (2)$$

Where:
CVR_i = Content Validity Ratio of acceptable items
M = Total acceptable items

2.4.2. Instrument reliability

Measuring internal consistency is the most common way to estimate the reliability of a test or scale, when sets of items are expected to measure the same attribute or content; the most used coefficient is Cronbach's Alpha, which measures the test reliability based on the length and covariance between items [23]. Therefore, when the expert validation concluded, the reliability of the instrument was evaluated through a pilot study in which the survey was administered to a sample of 30 operators working in an aerospace company in Mexicali, Baja California, where access and empirical administration were allowed. Cronbach's Alpha was then calculated with the survey results, to verify their reliability. The software used was SPSS version 22. The individual constructs, as well as the whole measuring instrument, obtained values greater than 0.70, which is considered adequate [25]. Therefore, the instrument was considered reliable and valid to be administered to the population of interest. The final instrument then consists of 73 items that evaluate six different constructs of psychosocial risk and one more that measures work burnout.

Table 6
List of eliminated items by construct

Construct	Item
Workload imbalance	CL8
Lack of empowerment	EM4, EM7
Insufficient reward	R10
Role conflict and ambiguity	AR8
Work burnout	DL11, DL17

Source: The Authors

2.4.3. Evaluation of the scale through empirical validation

In order to validate the scale, it was distributed to a sample consisting of 394 aerospace industry operators in Mexicali, Baja California. There were 367 (93.1%) valid responses that were used to perform the calculations. On a first run, several of the constructs were identified as non-unidimensional. A main component factor analysis was performed to determine the factor structure of each of the problematic constructs, using the Kaiser-Meyer-Olkin (KMO) coefficient and the Bartlett Sphericity tests. Data was analyzed using SPSS 22.0. The resulting two-dimensional structure is shown on Table 7. Further analysis resulted on the elimination of 8 items: 7 due to low cross-loading values (C5, C8, EMP1, EMP5, NVO6. REL9, and REL10), and 1 due to co-linearity (NVO3). The statistical analysis for the resulting model was performed with Partial Least Squares Structural Equation Modeling (PLSSEM) technique using the SmartPLS 3.0 software.

3 Results

3.1. Internal Consistency Reliability and Convergent Validity

The traditional criterion for internal consistency is Cronbach's alpha, which provides an estimate of the reliability based on the intercorrelations of the observed indicator variables. However, Cronbach's alpha has some limitations: first, it assumes that all indicators are equally reliable; moreover, this criterion is sensitive to the number of items in the scale and generally tends to underestimate the internal consistency reliability. As such, it may be used as a more conservative measure of internal consistency reliability. For a more technically appropriate evaluation it is recommended to apply a different measure of internal consistency reliability, which is referred to as composite reliability. This measure of reliability takes into account the different outer loadings of the indicator variables [26]. Table 7 shows the calculated values of Cronbach's alpha, and

composite reliability. It can be seen that two values are below 0.600 for Cronbach's alpha: "High demand" (0.599) and "Involvement" (0.402). However, all values are greater than 0.700 for composite reliability.

Convergent validity signifies that a set of indicators represents one and the same underlying construct, which can be demonstrated through their unidimensionality [27]. To evaluate it, researchers consider the outer loadings of the indicators and the average variance extracted (AVE) [26]. The results in Table 8, show values that vary from 0.501 (High demand) to 0.789 (Efficacy). All calculations are greater than 0.500, the minimum value accepted.

3.2. Discriminant Validity

According to Hair et al. [26], discriminant validity is the extent to which a construct is truly distinct from other constructs by empirical standards. Thus, establishing

discriminant validity implies that a construct is unique and captures phenomena not represented by other constructs in the model. Two criteria were calculated to test the discriminant validity: the Fornell-Larcker criterion and the heterotrait-monotrait ratio (HTMT).

The Fornell–Larcker criterion postulates that a latent variable shares more variance with its assigned indicators than with any other latent variable. In statistical terms, the AVE of each latent variable should be greater than the latent variable's highest squared correlation with any other latent variable [27]. This is shown on the main diagonal of Table 9, where it can be seen that, for instance, for "Uncertainty", the calculated square root of its AVE is 0.816, which is the largest number when compared to the values calculated for other latent variables along its column (underneath: 0.018, 0.210, 0.109, 0.385, 0.144, 0.357, 0.281, 0.316) and its row (to the left: 0.342, 0.094, -0.008, 0.375, 0.362, 0.391). The same is true for the rest of the latent variables.

Table 7
Two-dimensional structure and number of items per construct.

First level construct	Second level construct	Number of items
Work burnout	Exhaustion	5
	Cynicism	6
	Efficacy	5
Workload imbalance	High demand	3
	Excessive workload	4
Lack of empowerment	Lack of control	3
	Exclusion	3
Uncertainty about new labor schemes	Change	3
	Involvement	2
	Uncertainty	3
Insufficient rewards	Reward	3
	Development	5
	Recognition	3
Poor interpersonal relationships	Interp_Relation	8
Role conflict and ambiguity	Role	9

Source: The Authors

Table 8
Internal consistency reliability and convergent validity by latent variable.

Construct	Cronbach's alpha	Composite reliability	AVE
Exhaustion	0.899	0.926	0.716
Cynicism	0.932	0.947	0.747
Efficacy	0.932	0.949	0.789
High demand	0.599	0.738	0.501
Excessive workload	0.698	0.816	0.526
Lack of control	0.793	0.880	0.710
Exclusion	0.633	0.803	0.577
Change	0.714	0.840	0.637
Involvement	0.402	0.769	0.625
Uncertainty	0.747	0.857	0.667
Reward	0.672	0.816	0.598
Development	0.770	0.845	0.524
Recognition	0.716	0.842	0.642
Interp_Relation	0.862	0.893	0.513
Role	0.917	0.933	0.610

Source: The Authors

Table 9
Fornell–Larcker criterion for latent variables.

	Exhaustion	High demand	Reward	Excessive workload	Cynicism	Involvement	Uncertainty	Lack control	Exclusion	Efficacy	Change	Recognition	Development	Interp_Rel	Role
Exhaustion	0.85														
High demand	0.12	0.708													
Reward	0.08	0.323	0.773												
Excessive workload	0.48	0.356	0.003	0.73											
Cynicism	0.52	-0.07	-0.13	0.46	0.865										
Involvement	0.35	0.204	0.245	0.31	0.272	0.79									
Uncertainty	0.34	0.094	-0.01	0.38	0.362	0.39	0.82								
Lack control	0.07	0.308	0.281	0.02	-0.05	0.17	0.02	0.84							
Exclusion	0.17	0.339	0.364	0.23	0.192	0.28	0.21	0.31	0.76						
Efficacy	0.02	0.061	-0.05	0	0.088	0.1	0.11	0.17	0.04	0.89					
Change	0.39	0.079	0.039	0.52	0.585	0.44	0.39	0.11	0.3	0.04	0.8				
Recognition	0.33	0.158	0.39	0.28	0.329	0.31	0.14	0.01	0.35	0.09	0.34	0.8			
Development	0.53	0.008	0.131	0.52	0.652	0.31	0.36	0.3	0.31	0.04	0.62	0.4	0.8		
Interp_Rel	0.45	0.124	0.157	0.48	0.571	0.37	0.28	0.22	0.34	0.14	0.44	0.58	0.72	0.72	
Role	0.37	-0.02	0.056	0.49	0.596	0.26	0.32	0.15	0.3	0.18	0.54	0.47	0.65	0.61	0.781

Source: The Authors

Table 10
Heterotrait-monotrait ratio for latent variables

	Exhaustion	High demand	Reward	Excessive workload	Cynicism	Involvement	Uncertainty	Lack control	Exclusion	Efficacy	Change	Recognition	Development	Interp_Rel	Role
Exhaustion															
High demand	0.16														
Reward	0.11	0.64													
Excessive workload	0.61	0.47	0.16												
Cynicism	0.55	0.28	0.17	0.57											
Involvement	0.6	0.43	0.48	0.58	0.45										
Uncertainty	0.42	0.22	0.19	0.52	0.1	0.43									
Lack control	0.09	0.44	0.37	0.14	0.32	0.1	0.44								
Exclusion	0.26	0.53	0.55	0.42	0.1	0.1	0.3	0.08							
Efficacy	0.04	0.12	0.07	0.06	0.71	0.57	0.33	0.07	0.44						
Change	0.47	0.25	0.12	0.74	0.4	0.82	0.3	0.2	0.07	0.07					
Recognition	0.41	0.25	0.56	0.39	0.76	0.18	0.13	0.4	0.2	0.44	0.51				
Development	0.62	0.28	0.21	0.71	0.76	0.58	0.47	0.13	0.2	0.07	0.83	0.48			
Interp_Rel	0.49	0.25	0.22	0.6	0.63	0.65	0.35	0.28	0.16	0.47	0.55	0.74	0.66		
Role	0.4	0.22	0.14	0.6	0.64	0.45	0.38	0.2	0.41	0.21	0.67	0.59	0.76	0.685	

Source: The Authors

The heterotrait-monotrait ratio (HTMT) of the correlations, is an estimate of what the true correlation between two constructs would be, if they were perfectly measured [26]. The maximum threshold level of the HTMT is debatable. Some authors suggest a threshold of 0.85, whereas others propose a value of 0.90 [28]. In this case, as shown in Table 10, all the calculated values for the latent variables are lower than the strictest threshold of 0.85, since the larger values are for the "Development"-"Change" (0.825) and the "Involvement"-"Change" (0.822) ratios.

4. Discussion and conclusion

Work burnout syndrome is considered an occupational hazard [26], therefore, screenings at the workplace and identifying psychosocial risk factors related to burnout are crucial to ensure a healthy work environment. Per the above, the aim of this study was to design and validate a useful measuring instrument to evaluate those psychosocial risk factors and work burnout, within a manufacturing work environment in the aerospace industry. The tests showed a scale that is reliable and valid to measure work burnout plus six psychosocial risk factors: workload imbalance, poor interpersonal relationships, lack of empowerment,

insufficient rewards, role conflict and ambiguity, and uncertainty about new labor schemes. The existence of such measurement instruments like this one, is essential not just to evaluate the presence of the syndrome, but also to identify its potential causes and work on appropriate solutions.

Previous studies indicate that this syndrome is not a problem created by employees, but one that arises in the workplace when the company does not recognize the human side of work, or demands an excessive work effort, which results on people feeling overwhelmed, frustrated and worn out [27]. Also, the implications on workers wellbeing may be many and varied: from headaches, insomnia, sleeping and eating disorders, fatigue, irritability, emotional instability and problematic social relationships, up to alcoholism and health problems like high blood pressure and heart failure [10].

Like any other study, this effort has several limitations. First, only the six risk factors are included and life-work imbalance, inappropriate work environment, discrimination and physical risk were not researched in depth. Also, work burnout is the only job hazard being evaluated, while others such as stress, harassment or work violence are not being considered. Moreover, it should be noted that the scale is designed for the operational level personnel of the aerospace industry and it must be adapted in the case of other work environments. Finally, in regards to the tests, even though the composite reliability and AVE values for "Involvement" are greater than the minimum accepted, the Cronbach's alpha is very low, which requires to revisit the construct and try to improve the indicator's reliability by adding more items, since currently it only has two.

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