

Online Research @ Cardiff

This is an Open Access document downloaded from ORCA, Cardiff University's institutional repository: <http://orca.cf.ac.uk/113575/>

This is the author's version of a work that was submitted to / accepted for publication.

Citation for final published version:

Capasso, Roberto, Zurlo, M-C and Smith, Andrew 2018. Stress in factory workers in Italy: an application of the Ethnicity and work-related stress model in Moroccan factory workers. *Psychology and Developing Societies* 30 (2) , pp. 1-34. 10.1177/0971333618783397 file

Publishers page: <http://dx.doi.org/10.1177/0971333618783397>
<<http://dx.doi.org/10.1177/0971333618783397>>

Please note:

Changes made as a result of publishing processes such as copy-editing, formatting and page numbers may not be reflected in this version. For the definitive version of this publication, please refer to the published source. You are advised to consult the publisher's version if you wish to cite this paper.

This version is being made available in accordance with publisher policies. See <http://orca.cf.ac.uk/policies.html> for usage policies. Copyright and moral rights for publications made available in ORCA are retained by the copyright holders.



Stress in Factory Workers in Italy: An Application of the Ethnicity and Work-related Stress Model in Moroccan Factory Workers

Roberto Capasso¹
Maria Clelia Zurlo¹
Andrew P. Smith²

Abstract

The ethnicity and work-related stress model (EWS; Capasso, Zurlo, & Smith, 2018, *British Journal of Education, Society & Behavioural Science*, 15, 1-20) integrated EWS dimensions in a multidimensional perspective combining demographic (sex, education) and individual characteristics (coping styles, Type A and Type D), cultural dimensions (acculturation strategies, perceived racial discrimination), work characteristics (work demands, work resources, rewards) and appraisals (job stress/satisfaction), in the prediction of psychophysical health conditions in migrant workers. The current research aimed to test the application of the EWS in a sample of Moroccan factory workers and hypothesised significant and specific profiles of associations between individual, ethnic and work characteristics, with psychophysical health outcomes. A questionnaire consisting of five sections measuring sociodemographics and individual

¹Department of Political Sciences, University of Naples 'Federico II', Naples, Italy.

²Centre for Occupational and Health Psychology, School of Psychology, Cardiff University, Cardiff, UK.

Corresponding author:

Roberto Capasso, Department of Political Sciences, University of Naples 'Federico II',
Via Rodinò 22, 80133 Naples, Italy.
E-mail: roberto.capasso@unina.it

differences (coping styles/personality), cultural dimensions (acculturation strategies), work characteristics, appraisals (job satisfaction/stress) and subjective reports of health was administered to 250 Moroccan factory workers in Italy. Data were analysed using logistic regression to evaluate the independent and combined effects of all dimensions reported on the risk of suffering health problems. Data revealed specific and significant associations of individual characteristics, cultural dimensions and job characteristics with health outcomes. Findings will be useful in defining psychological interventions to promote well-being in specific workplaces supporting the dimensions suggested by the model applied.

Keywords

Ethnicity, factory workers, multidimensional perspective, work-related stress models, psychophysical health

Introduction

In recent years, research has shown that factory workers develop a variety of occupational illnesses which reflects the impact of working conditions on their lives. Many studies have focused on the disadvantageous working conditions in Japan (Inoue et al., 2010), Singapore (Chia, Chia, & Ong, 1991; Chia, Chia, Ong, & Jeyaratnam, 1996), China (Li et al., 2007), Thailand (Sornprasit, 2001), Korea (Choi, Lee, & Chung, 2001) and the USA (Hodgkins, Hinkamp, Robins, Schork, & Krebs, 1991) while a cross-national study by Seedat et al. (2009) reviewed physical and psychological symptoms in different countries of Europe.

In particular, a report by the ILO (International Labour Organization, 2004) has highlighted that migrants are clearly more frequently employed in the 'three D-jobs': dirty, dangerous and demanding, in the sectors of agriculture and horticulture, construction, healthcare, households, transport and food. Eurofound (2008) points out that in addition to labour shortages other factors help to explain the segregation of migrants in less rewarding jobs and sectors, including language and legal barriers to skilled occupations along with different forms of discrimination.

In accordance with the general European situation, Moroccan migrants are the third largest foreign community in Italy and most of them work in sectors such as construction, small industry and cleaning services.

By 2008, 78.5 per cent of active Moroccans were employed, while 19 per cent were self-employed and a little over 2 per cent searching for work. Two-thirds of Moroccans are employed in the trade sector, under a fifth in construction, 5 per cent in transport and little over 1 per cent in manufacturing industry (Italian National Institute of Statistics [ISTAT], 2014; Mghari & Fassi Fihri, 2010). Today, around 7 per cent of Moroccans are employed in agriculture, 48.9 per cent in industry (including 19% in construction) and 42.5 per cent in services.

Moroccan settlement in Italy is reflected in relatively high levels of family reunification and naturalisation. In 2003, Moroccan citizens constituted 6 per cent of all visas issued to foreign nationals for employment and 13 per cent of those issued for family reunification. In 2006, 3,295 Moroccans became Italian citizens. By 2010, the Moroccan community in Italy had a population of 431,529 people, over half of which were living in four northern regions: Lombardy (104,606), Emilia Romagna (67,262), Piedmont (62,366) and Veneto (56,704). In southern Italy, the majority of Moroccans reside in Campania (12,267), Sicily (11,468) and Calabria (10,737) (ISTAT, 2014; Mghari & Fassi Fihri, 2010).

Around 73 per cent of Moroccan residents in Italy are actively engaged in the Italian labour market. The average annual wage of Moroccan workers is €11,437, which is slightly higher than the average for immigrants in Italy in general (€10,343). Moroccans are also more likely to be employed with fixed-term contracts than other large foreign communities in Italy (19.9% compared to the average of 15.6%). Around 59 per cent of Moroccan residents in Italy are men, their average age is 35 years and the average length of time spent in Italy is just under 5 years (4.9). Most Moroccans in Italy have secondary school education (57%). Nearly a fifth have primary school education only (18.8%), while over a fifth are literate but do not have any qualifications.

Moreover, this group of migrants tends to rent apartments and live with family but in the beginning of their migration experience prefers to share house with other people in order to save as much money as possible waiting for a fixed contract to apply for family reunification and naturalisation (ISTAT, 2014).

These living and working conditions in Morocco are quite different with respect to Italy. In fact, Morocco's labour force generally lacks proper job training and secondary education, which explains why much of the younger workforce cannot expect high-paying jobs. Despite higher rates of school enrolment since the 1960s, illiteracy in Morocco is one of the highest in the Arab world, standing at 56.3 per cent (69% for women

and 43.3% for men). The educational sector remains overburdened and under-staffed, and shortages in technical skills are viewed as a major impediment to business operations. Unemployment remains especially high in urban areas, especially for women and for all workers under 34 years of age. Unemployment is also higher for university graduates and diploma holders (ILO, 2004).

The government of Morocco supports workers' rights promoted by the ILO (2004) and has set conditions governing industrial and human relations and established minimum-wage standards. The 5-day 48-hour workweek is the standard. The government-mandated minimum wage in the public sector is approximately US\$165 a month. The government provides social security benefits that include a retirement pension and pay for on-the-job injuries. Wages have increased steadily over the last few years and are expected to increase again.

Research on the occupational health of factory workers has shown a relationship between the impact of specific working conditions, different psychosocial factors and resettlement in the host country on psychophysical illness. In particular, factors specifically related to the manufacturing process (i.e., work environment contamination, noise, repetitive motion, frequent lifting and shift work—Chia et al., 1991; Hodgkins et al., 1991; Inoue et al., 2010; NIOSH, 1999; Sornprasit, 2001), relationships at work with colleagues and supervisors (Choi et al., 2001) and salary (Carballo, 1998; Jamal, 1999; Kurz, 2002; Li et al., 2007; London, Scott, & Hunter, 2002; Milkie, Mattingly, Nomaguchi, Bianchi, & Robinson, 2004) were highlighted to be the major factors associated with psychological and physical health conditions. However, in these last studies, if overload yields increase income for factory workers, long work hours may not be an issue and are positively related to job satisfaction (Dua, 1994; Jamal, 1999; Kurz, 2002; London et al., 2002; Milkie et al., 2004). In work-related stress models, individual difference variables, such as, personality and coping styles, might interact with work conditions to influence occupational health by either buffering or increasing effects (Parkes, 1994). Most research has focused on individual difference variables such as Type D (Levin & Stokes, 1989; Lind & Otte, 1994; Murphy, 1995; Spector, 2003; Terry, Nielsen, & Perchard, 1993; Watson & Clark, 1984) and Type A (Bluen, Barling, & Burns, 1990; Edwards, Baglioni, & Cooper, 1991; Ganster, Schaubroeck, Sime, & Mayes, 1991; Ivancevich & Matteson, 1988; Lee, Ogle, & Sapolsky, 2002; Rosenman, 1991; Spence, Helmreich & Pred, 1987) personality characteristics and coping strategies (Briner, Harris, & Daniels, 2004; Moran, 1999; Parkes, 1994). These individual differences (IDs) can play major roles in the processes

by which psychosocial work conditions influence mental and physical health outcomes.

All the studies on factory workers focused on specific aspects influencing health conditions, but a comparative approach may suggest looking in more detail at differences in work characteristics and work conditions, cultural dimensions, appraisals and health outcomes in migrant and native workers. In order to focus on health conditions in workers varying in ethnicity and whether the effects on psychophysical health were influenced by job type and ethnicity, cultural dimensions and their different aspects linked to work-related stress factors and occupational outcomes need to be considered. Indeed, in the last two decades, the field of ethnicity and occupational health has been under-researched. In particular, the complex nature of the relationship between discrimination experiences (Noh & Kaspar, 2003), cultural identity (Phinney, 1992), acculturation strategies (Berry, 1997; Redfield, Linton, & Herskovits, 1936) and health outcomes among workers has not been considered. In fact, measures of work characteristics and/or work stress have been developed largely within single ethnic group data sets.

Most studies measure ethnicity as a descriptor of the working population studied or as an objective category (i.e., country of birth, nationality, language, skin colour, origin, racial group) or consider associations between factors such as exposure to discrimination and psychophysical health conditions (Karlsen et al., 2005; Roberts, Swanson, & Murphy, 2004; Wong, Bond, & Rodriguez Mosquera, 2008), work characteristics or appraisals (Emerson & Murphy, 2014; Krings et al., 2014; Linnabery, Stuhlmacher, & Towler, 2014; Nazroo, 2003; Szczepura et al., 2004). These are usually reported as single associations rather than in a general model that integrates all aspects of ethnicity and work-related dimensions in a multidimensional perspective and focuses on specific health problems such as anxiety, depression and cardiovascular reactivity. Only one study (Smith et al., 2005) combined ethnicity with perceived racial discrimination, suggesting detailed consideration of other aspects of ethnicity such as cultural identity and acculturation. Therefore, ethnicity should be considered not only as a descriptor but also as an individual characteristic influencing the immigration experience and as a potential source of pressure related to workers' well-being. Other studies based on ethnic minorities have used an epidemiological or a mixed approach that tries to integrate psychosocial and cultural aspects (Bochhah, 2006; Giga & Hoel, 2006; Gliber, 2004; Hoel & Cooper, 2000; Lehman, Chiu, & Schaller, 2004; McGinnity, O'Connell, Quinn, & Williams, 2006; McKay, 2007; Seedat et al., 2009; Werner, 2001).

The Ethnicity and Work-related Stress Model

A specific application of previous approaches for effectiveness in a multicultural workforce has been largely untested. An alternative approach would involve a greater incorporation of cultural issues and individual characteristics into a multidimensional perspective to ensure that such practices are effective and relevant across ethnic groups.

Therefore in the field of occupational stress, starting from the approach of the Demand-Resources-Individual effects (DRIVE) model by Mark and Smith (2008), the ethnicity and work-related stress (EWS) model has been proposed and tested (Capasso, Zurlo, & Smith, 2018).

In the DRIVE model, the inclusion of perceived job stress as a mechanism by which the levels of workplace psychosocial demands and resources can affect health outcomes was also suggested. Despite it being hypothesised that it has a mediating effect it was not included in the initial analyses. It is also proposed that IDs can not only moderate the relationship between environmental factors and perceived stress, but that they can also moderate the relationship between perceived stress and health outcomes. Likewise, IDs (personal demands and resources) are proposed to have independent main effects on perceived job stress and health outcomes, that is, levels of clinical anxiety and depression, illness caused by work stress, showing the lack of interaction effects in the model and its multidimensional form (Mark & Smith, 2012a, 2012b).

The EWS model accounted for the role of important individual difference factors in influencing the possible health-related outcomes that result from subjective stressful perceptions. It was considered as a possible framework for studies using a multidimensional model of stress that integrates all the ethnicity aspects with work-related stress dimensions. In addition, it investigates the associations between individual differences, cultural dimensions, work characteristics, appraisals and health outcomes in a sample of workers varying in ethnicity (Figures 1 and 2).

This model includes the main direct effects of the traditional job stress variables (from Demand-Control-Support [DCS, Karasek, 1985] and Effort-reward Imbalance [ERI, Siegrist, 1996] models), individual differences in the forms of coping styles and personality behaviours and the cultural variables such as acculturation, and ethnic identity either as demographic variables, individual differences or potential sources of risk for health. Moreover, the three variables of perceived job satisfaction, perceived job stress and perceived racial discrimination were hypothesised as potential mediators in the prediction of subjective reports of health.

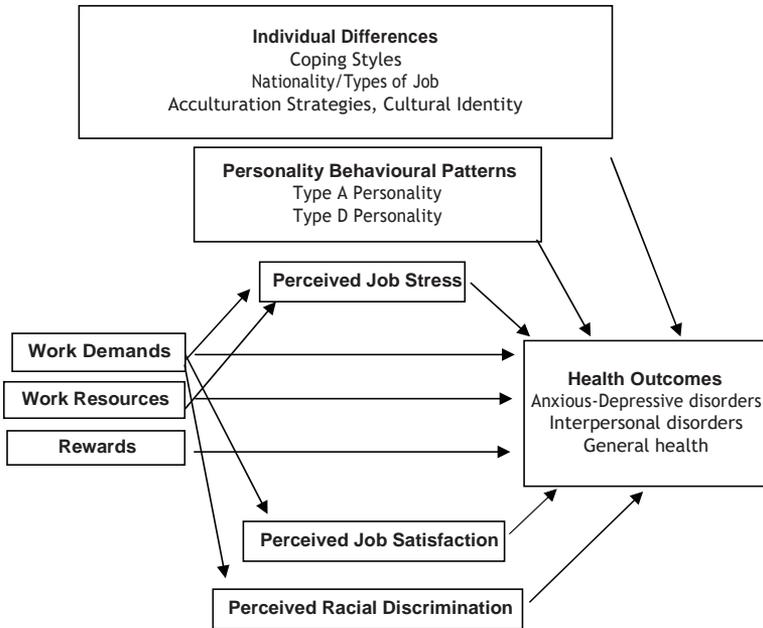


Figure 1. Ethnicity and Work-related Stress Model (EWS)

Source: Capasso, Zurlo and Smith (2016a).

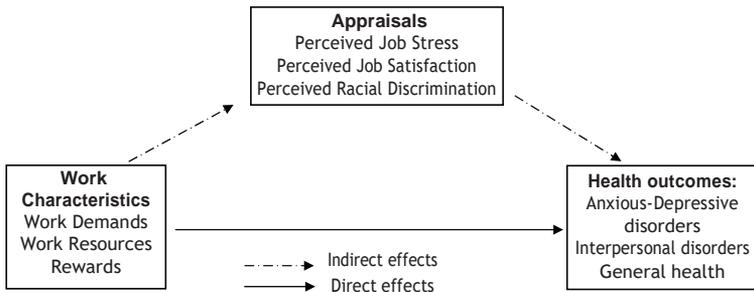


Figure 2. Indirect Effects of Appraisals over the Relationship between Work Characteristics and Health Outcomes (EWS)

Source: Capasso, Zurlo and Smith (2016b).

The EWS model suggests to examine some interaction and combined effects in order to test the additive effects of specific factors. In fact, the influence of individual differences, psychosocial job characteristics and

cultural dimensions on health outcomes was tested computing all these factors into the Total Negative Occupational–Cultural Score in the prediction of psychophysical health conditions (Capasso, 2015).

Moreover, the EWS model took into account potential indirect effects of work characteristics through perceived racial discrimination and perceived job satisfaction/stress on health outcomes, but there were no significant data to demonstrate this evidence (Capasso et al., 2018).

Finally, despite a large literature suggesting interactions between individual characteristics and perceived stress in the prediction of health and the consequent moderating effects of IDs as coping strategies (Long, Kahn, & Schutz, 1992; Mark & Smith, 2012a, 2012b; Semmer, 2003; Spector, 2003), there were no data supporting these associations for the EWS model.

The factors derived by the subscales of the EWS questionnaire (Capasso et al., 2018) were reported in Table 1.

Study Aims

On the basis of the previous research on ethnicity and occupational health, and on factory workers, the aim of the current study was to test the model in a sample of Moroccan factory workers of the multidimensional model of ethnicity and work-related stress (Capasso et al., 2018).

In particular, the model for the sample as whole hypothesised that the effects of work characteristics, individual differences and appraisals on psychophysical health conditions might vary with job characteristics and with workers differing in ethnicity.

Therefore, the study evaluated whether the effects of ethnicity are mostly independent of work-related factors while job and socio-demographic characteristics may be more relevant in the association with occupational health outcomes in migrant factory workers.

However, it was proposed that there would be a significant and specific profile of independent and combined associations between individual characteristics, cultural dimensions, work characteristics, perceived job satisfaction/stress and health outcomes in the Moroccan factory workers and potential indirect effects of work characteristics through perceived work stress/perceived job satisfaction on health outcomes.

The 16 factors included into the model were evaluated and the pattern of significant associations was examined.

Table 1. Summary of All the Factors Derived by the Combined Subscales of the EWS Questionnaire

Dimensions' Model	Factors	Subscales
Work characteristics	Work demands	Overcommitment, effort, job demands
	Intrinsic/extrinsic rewards	Esteem rewards, job security prospects rewards
	Work resources	Social support, job control
	Emotional-relational coping	Involvement, home-work relationships, social support, time management
Individual differences	Objective coping	Logic, task strategy
	Type A behaviour	Time-conscious behaviour, emotional suppressive/ambitious-competitive behaviour, efficient behaviour
	Negative affectivity	NA
	Social inhibition	SI
Appraisals	Perceived job satisfaction	Intrinsic and job itself satisfaction, working conditions satisfaction, extrinsic job satisfaction, employee relations satisfaction
	Perceived job stress	Single item
Cultural dimensions	Perceived racial discrimination at work	Single item
	Affirmation/maintenance culture	Affirmation/belonging/commitment, maintenance culture
	Search identity/adoption of the host culture	Search ethnic identity, adoption host culture
Psychophysical health outcomes	Anxious-depressive disorders	Depression, somatisation, anxiety
	Relational disorders	Interpersonal sensitivity, paranoid ideation, obsession-compulsivity, hostility
	General health	Single item

Source: Capasso et al. (2016a).

Methods

Participants

A total of 316 questionnaires were distributed to the Moroccan factory workers, with 250 returned and considered valid (response rate = 79.1%). The Moroccan factory workers were recruited from different associations of immigrants in southern Italy and all of them were employed in manufacturing industries. Most of them lived alone or with some colleagues but almost all of them were married and had already applied for family reunification and naturalisation.

After deciding on the ethnic minorities to be studied, I contacted the heads of the associations of immigrants which supported this ethnic group in terms of financial support, seeking job, applying for documents and where I worked as volunteer and I invited them to participate in our study and agreed 2 times a week in each association to submit the questionnaire individually. Questionnaires lasted 50–60 minutes and were conducted by two psychologists familiar with this study and speaking English and French to cope with possible Italian language difficulties of some participants. Among the volunteers, some of them complete the questionnaires in two different times because they were busy in other association's activities during the presence of the two interviewers.

Ethical approval was provided by University of Naples 'Federico II' and informed consent was achieved within the questionnaire where participants could not continue beyond the consent page without agreeing.

Ethical approval was provided by the University where the study was carried out and informed consent was achieved within the questionnaire where participants could not continue beyond the consent page without agreeing.

Measures

The questionnaire used for this study consisted of five sections.

Section 1 included measures of the respondent's personal and biographical details (e.g., gender, age, education, marital status) and job characteristics (e.g., employment, type of contract, number of hours worked).

Section 2 measured individual characteristics and cultural dimensions using: the Coping Style Inventory (Cooper, Sloan, & Williams,

1988; Zurlo & Pes, 2012; Zurlo, Pes, & Capasso, 2013), a measure of strategies for coping with job stress consisting of 28 items (Cronbach's $\alpha = 0.78$) divided into 6 subscales such as involvement, home-work relationships, social support, time management, logic and task strategies; the Bortner's Type A Behavioural Style Inventory (Bortner, 1969; Zurlo et al., 2013) comprising of 14 bipolar adjectival items (Cronbach's $\alpha = 0.77$) and 3 subscales (time-conscious behaviour, emotional suppressive/ambitious-competitive behaviour and efficient behaviour); the Type D Personality (Denollet, 2005) consisting of 14 items (Cronbach's $\alpha = 0.88$) and the 2 subscales of negative affectivity (NA) and social inhibition (SI); the Phinney's Multigroup Ethnic Identity Measure (MEIM; Phinney, 1992) consisting of 15 items (Cronbach's $\alpha = 0.84$); two subscales namely ethnic identity search, and affirmation, belonging and commitment and Berry's measures of ethnic identity and acculturation (1997) involving two items asking 'Is it considered to be of value to maintain cultural identity and characteristics?' and 'Is it considered to be of value to maintain relationships with other groups?' and a single item *relating* to reporting discrimination at work on the basis of race or ethnicity (Smith, Johal, Wadsworth, & Peters, 2000).

Section 3 measured work characteristics: the Job Content Questionnaire (JCQ; Karasek, 1985) consisting of 48 items (Cronbach's $\alpha = 0.82$) and 3 subscales which were job demand, job control and job support; and the ERI test (Siegrist, 1996; Zurlo, Pes, & Siegrist, 2010) that comprised of 23 items and 4 scales of effort (Cronbach's $\alpha = 0.79$), esteem reward (Cronbach's $\alpha = 0.80$), job security prospects reward (Cronbach's $\alpha = 0.84$) and overcommitment (Cronbach's $\alpha = 0.79$).

Section 4 referred to appraisals: the Job Satisfaction Scale (Warr, Cook, & Wall, 1979; Zurlo et al., 2013) consisting of 15 items (Cronbach's $\alpha = 0.88$) divided into 4 subscales such as intrinsic and job itself satisfaction, working conditions satisfaction, extrinsic job satisfaction, employee relations satisfaction and a single item asking 'In general, how stressful do you find your job?' (Smith et al., 2000).

Section 5 referred to subjective reports of health: the Symptom Checklist 90 R (SCL-90-R, Derogatis, 1994; Prunas et al., 2010) consisting of the 90 items and the following subscales: anxiety ($M = 1.27$, $SD = 0.80$, Cronbach's $\alpha = 0.87$), depression ($M = 1.73$, $SD = 0.83$, Cronbach's $\alpha = 0.89$), somatisation ($M = 1.12$, $SD = 0.74$, Cronbach's $\alpha = 0.86$), obsessive-compulsive ($M = 1.57$, $SD = 0.81$, Cronbach's $\alpha = 0.87$), interpersonal sensitivity ($M = 1.40$, $SD = 0.87$, Cronbach's $\alpha = 0.87$), hostility ($M = 0.89$, $SD = 0.71$, Cronbach's $\alpha = 0.74$), phobic anxiety ($M = 0.89$, $SD = 0.85$, Cronbach's $\alpha = 0.84$), paranoid ideation

($M = 1.13$, $SD = 0.82$, Cronbach's $\alpha = 0.76$) and psychoticism ($M = 0.83$, $SD = 0.63$, Cronbach's $\alpha = 0.78$) and a single item asking 'Over the past 12 months, how would you say your general health has been?' (Smith et al., 2000).

Statistical Analysis

Data were analysed using SPSS version 20 and PROCESS Software for SPSS (Hayes, 2011). The analytical methods used in this study to define the model consisted of descriptive statistics and logistic regression to examine the predictive value of the factors involved in the EWS model (Capasso et al., 2018) applied to Moroccan workers. Preliminary analysis of frequencies and percentages of Moroccan factory workers' presence of socio-demographic and individual characteristics (i.e., coping strategies, Type A and Type D Personality), cultural dimensions (i.e., acculturation strategies, perceived racial discrimination), job characteristics, self-reported psychological and physical diseases (anxious–depressive disorders, interpersonal disorders, physical disorders) and job satisfaction was evaluated.

First, descriptive statistics for gender, age, ethnicity, education, type of job, work status and type of contract were carried out to evaluate socio-demographic characteristics in Moroccan factory workers. Moreover, cross-tabulations analyses to specify percentages and p -values of the significant association between health outcomes and independent variables (i.e., coping strategies, Type A and Type D) were reported.

Second, to test the combined effects, multivariable associations of Negative Occupational–Cultural Factors Score (NOCF Score components) with psychophysical health outcomes were examined. The new variable designed 'Negative Occupational–Cultural Factors Score' was calculated by adding all the following factor scores split at the median (recoded as 0 = good and 1 = bad depending on the type of factor): work demands, intrinsic/extrinsic rewards, work resources, emotional/relational coping, objective coping, Type A behaviour, SI, NA, perceived racial discrimination. A tertile split (1 = low exposure, 2 = moderate exposure, 3 = high exposure) of this total NOCF exposure variable (ranged 0–9) was preferred to a median split because three levels of exposure were more adapted to describe the potential linear effects of the exposure to negative occupational–cultural factors on health outcomes using logistic regression analyses. The 'indicator' contrast was

used in order that the tabulated odds ratios were compared to the lower tertile, here set as the reference category (Capasso, 2015).

In particular, high levels of work demands, Type A behaviour, SI (Type D), NA (Type D) and perceived racial discrimination were associated with increased levels of negative health outcomes (coded as low = 1 and high = 2). Moreover, high levels of intrinsic/extrinsic rewards, work resources, emotional/relational coping and objective coping were associated with low levels of psychophysical problems (coded as low = 1 and high = 2). To compute Total Negative Occupational–Cultural Score, these factors were recoded as 2 = 0 (good) and 1 = 1 (bad). Finally, Total Negative Occupational–Cultural Score was the sum of: work demands, intrinsic/extrinsic rewards, work resources, emotional/relational coping, objective coping, Type A behaviour, SI, NA and perceived discrimination (all the factors were recoded as good = 0 and bad = 1, ranged 0–9).

Third, a series of logistic regression analyses (method: enter, first indicator contrast) between health outcomes and job satisfaction/stress and the independent variables (with $p < 0.05$ as the entry criterion and $p > 0.01$ as the removal criterion and the Hosmer and Lemeshow goodness-of-fit statistic fixed at $p > 0.05$) were conducted to verify the relationships between the variables tested by the model (i.e., emotional–relational coping, objective coping, Type A behaviour, NA, SI, acculturation strategies, perceived racial discrimination, work demands, intrinsic/extrinsic rewards, work resources, perceived job satisfaction/stress, anxious–depressive disorders, interpersonal disorders and general health) for Moroccan factory workers in terms of specific main and interaction effects.

Finally, the Z Sobel test, using PROCESS software for SPSS (Hayes, 2011) was used to explore the indirect effects of work characteristic through perceived work stress and perceived job satisfaction on health outcomes (95% confidence intervals of the mediation after bootstrapping 5000 samples).

Results

Descriptive analyses were used to explore the frequencies and percentages of Moroccan factory workers' socio-demographic and individual characteristics, cultural dimensions, job characteristics and self-reported psychological and physical diseases (refer to Table 2).

Table 2. Descriptive Statistics of Moroccan Factory Workers (Age, $M = 40.78$; $SD = 3.51$)

	Moroccan factory workers	
	N	%
Socio-demographic		
<i>Gender</i>		
Female	25	10
Male	225	90
<i>Marital status</i>		
Married	231	83.2
Unmarried	19	16.8
<i>Education</i>		
Middle school	143	57.2
High school	107	42.8
Individual characteristics		
Emotional-relational coping	89	35.6
Type A behaviour	111	44.4
Social inhibition	79	31.6
Cultural dimensions		
Affirmation/maintenance culture	144	57.6
Perceived racial discrimination	65	26
Job characteristics		
<i>Work status</i>		
Part time	3	1.2
Full time	247	98.8
<i>Contract type</i>		
Fixed term contract	85	34.1
Temporary/casual	165	65.9
Job satisfaction	101	40.4
Health outcomes		
Interpersonal disorders	120	48
Anxious-depressive disorders	82	32.8
Physical diseases	101	40.4

Source: Capasso et al. (2016a).

Most of the Moroccan factory workers (age, $M = 40.78$, $SD = 3.51$) were male (90%), married (83.2%) and with a medium level of education (57.2%). In regard to individual characteristics, 35.6 per cent ($N = 89$) of migrant workers favoured strategies centred on emotional–relational coping, while 44.4 per cent ($N = 111$) showed Type A behaviour and 31.6 per cent ($N = 79$) SI. Moreover, considering the adopted acculturation strategies and the previous experience of racial discrimination, 57.6 per cent ($N = 144$) revealed the recourse to acculturation strategies centred on affirmation/maintenance culture, while 26 per cent ($N = 65$) had experienced racial discrimination.

Considering job characteristics and relevant working conditions, all these migrants worked full-time with temporary contracts (65.9%), earned around 600 euros/month and 40.4 per cent ($N = 101$) perceived a good level of job satisfaction. Finally, looking in more detail at self-reported psychological and physical health conditions, cross-tabulations with related chi-square analyses described the significant association between coping strategies and personality behaviours and health outcomes among Moroccan factory workers. In particular, 60 per cent ($N = 75$) of Moroccan factory workers with high levels of Type A behaviour reported lower levels of relational disorders ($p = 0.002$); 54.3 per cent ($N = 88$) of Moroccan factory workers with high levels of NA reported higher levels of anxious–depressive disorders ($p = 0.044$); 56.5 per cent ($N = 91$) of Moroccan factory workers with high levels of SI reported lower levels of anxious–depressive disorders ($p = 0.006$). Finally, 85.7 per cent ($N = 108$) of Moroccan factory workers with high recourse to emotional–relational coping strategies reported good general health ($p = 0.000$).

In accordance with the hypothesis, the combined effects of individual differences, psychosocial job characteristics and cultural dimensions on psychophysical health conditions were evaluated among the Moroccan group.

Therefore, the total NOCF Score (Capasso, 2015) was computed (ranged 0–11) and its effects were associated with health outcomes (refer to Table 3)

Data revealed that the likelihood of reporting anxious–depressive disorders, relational disorders and poor general health increases in correspondence with increasing exposure to negative occupational–cultural factors from moderate levels (i.e., second tertile) to high levels of exposure (i.e., third tertile). These findings showed that for Moroccan workers, the likelihood of suffering relational disorders was higher than the other two health conditions (at the 3rd tertile).

Therefore, logistic regression analyses were carried out to explore the main significant effects of individual characteristics, cultural dimensions

Table 3. Multivariable Associations of Total Negative Occupational-Cultural Factors Score with Anxious-Depressive Disorders, General Health and Relational Disorders

Outcomes		OR	CI
Anxious-depressive disorders	1st tertile	1.00	
	2nd tertile	1.923	1.012-4.011
	3rd tertile	2.431	1.325-5.329
General health	1st tertile	1.00	
	2nd tertile	1.652	0.943-3.193
	3rd tertile	1.990	1.104-4.132
Interpersonal disorders	1st tertile	1.00	
	2nd tertile	1.852	1.003-3.321
	3rd tertile	3.061	1.631-6.311

Source: Capasso et al. (2016a).

Table 4. Multivariable Associations of Significant Main Effects with Perceived Job Satisfaction

Variables	OR	CI
Emotional-relational coping		
Low	1.00	
High	0.279	0.131-0.592
Search identity/adoption of the host culture		
Low	1.00	
High	0.382	0.206-0.707
Perceived discrimination		
Low	1.00	
High	0.409	0.195-0.861
Work resources		
Low	1.00	
High	2.138	1.191-3.839

Source: Capasso et al. (2016a).

and work characteristics on perceived job satisfaction/stress (refer to Tables 4 and 5) and the main and interaction effects of individual differences, cultural dimensions, work characteristics and appraisals on psychophysical outcomes in Moroccan factory workers (refer to Table 6).

Table 5. Multivariable Associations of Significant Main Effects with Perceived Job Stress

Variables	OR	CI
Objective coping		
Low	1.00	
High	0.603	0.379-0.815
Type A behaviour		
Low	1.00	
High	1.956	1.235-2.761
Affirmation/maintenance culture		
Low	1.00	
High	2.546	1.276-4.862
Work demands		
Low	1.00	
High	1.842	1.119-2.532

Source: Capasso et al. (2016a).

Table 4 shows the significant multivariable associations of individual differences, cultural dimensions and work characteristics on perceived job satisfaction. The group of Moroccan workers with high recourse to emotional-relational coping ($OR = 0.279$, $CI = 0.131-0.592$) and to acculturation strategy centred on search identity/adoption of the host culture ($OR = 0.382$, $CI = 0.206-0.707$) and those who had experienced racial discrimination ($OR = 0.409$, $CI = 0.195-0.861$) perceived significantly lower levels of job satisfaction. Conversely, Moroccan workers with high perception of work resources (i.e., social support and job control variables) perceived significantly higher levels of job satisfaction ($OR = 2.138$, $CI = 1.191-3.839$).

Table 5 shows the significant multivariable associations of individual differences, cultural dimensions and work characteristics on perceived job stress. The group of workers with high recourse to Type A behaviours ($OR = 1.956$, $CI = 1.235-2.761$), who favoured an affirmation/maintenance culture strategy ($OR = 2.276$, $CI = 1.276-4.862$) and with high perception of work demands ($OR = 1.842$, $CI = 1.119-2.532$), perceived significantly higher levels of job stress, while those who favoured objective coping ($OR = 0.603$, $CI = 0.379-0.815$) reported significantly lower perception of job stress.

Table 6. Multivariable Associations of Significant and Non-significant Main Effects with Interpersonal Disorders, Anxious-Depressive Disorders and General Health in Moroccan Factory Workers

	Relational Disorders		Anxious-Depressive Disorders		General Health	
	<i>OR</i>	<i>CI</i>	<i>OR</i>	<i>CI</i>	<i>OR</i>	<i>CI</i>
Individual characteristics						
Emotional-relational coping						
Low	1.00		1.00		1.00	
High	0.921	0.476-1.781	0.857	0.454-1.616	0.288	0.130-0.638*
Objective coping						
Low	1.00		1.00		1.00	
High	0.703	0.352-1.404	0.801	0.401-1.599	0.564	0.298-1.069
Type A behaviour						
Low	1.00		1.00		1.00	
High	0.437	0.255-0.749*	1.263	0.723-2.205	1.084	0.589-1.996
Negative affectivity						
Low	1.00		1.00		1.00	
High	1.059	0.577-1.942	1.961	1.115-3.448*	0.914	0.458-1.825
Social inhibition						
Low	1.00		1.00		1.00	
High	0.904	0.470-1.738	0.343	0.192-0.613*	0.668	0.336-1.329

Cultural dimensions

Perceived racial discrimination

Low	1.00		1.00		1.00	
High	2.181	1.152-4.130*	1.140	0.656-1.982	1.245	0.621-2.496

Affirmation/maintenance culture

Low	1.00		1.00		1.00	
High	0.537	0.264-1.091	0.773	0.429-1.393	0.675	0.347-1.315

Search identity/adoption of the host culture

Low	1.00		1.00		1.00	
High	1.786	1.043-3.058*	1.156	0.581-2.300	1.251	0.652-2.402

Work characteristics

Work demands

Low	1.00		1.00		1.00	
High	1.061	0.593-1.898	1.140	0.656-1.982	1.525	0.715-3.252

Intrinsic/extrinsic rewards

Low	1.00		1.00		1.00	
High	0.361	0.210-0.621*	0.339	0.172-0.668*	0.406	0.212-0.778*

Work resources

Low	1.00		1.00		1.00	
High	0.840	0.419-0.1.685	0.916	0.333-2.517	0.558	0.269-1.158

(Table 6 Continued)

(Table 6 Continued)

	Relational Disorders		Anxious-Depressive Disorders		General Health	
	<i>OR</i>	<i>CI</i>	<i>OR</i>	<i>CI</i>	<i>OR</i>	<i>CI</i>
Appraisals						
Perceived job satisfaction						
Low	1.00		1.00		1.00	
High	0.943	0.491-1.811	0.804	0.403-1.606	0.306	0.158-0.593*
Perceived job stress						
Low	1.00		1.00		1.00	
High	1.261	0.633-2.511	1.519	0.836-2.760	2.241	1.169-4.296*
Work characteristics × Cultural dimensions						
Work demands × Discrimination						
Low × Low	1.00					
High × High	2.875	1.437-5.436*	—		—	

Source: Capasso et al. (2016a).

Note: * $p < 0.05$ and ** $p < 0.001$.

Table 6 shows the main and interaction effects of individual characteristics, cultural dimensions, work characteristics and appraisals with perceived levels of both interpersonal and anxious–depressive disorders and general health conditions.

Migrant workers with high recourse to Type A behaviours ($OR = 0.437$, $CI = 0.255–0.749$) were less likely to suffer interpersonal disorders, while those with high recourse to a search identity/adoption of the host culture strategy ($OR = 1.786$, $CI = 1.043–3.058$) and who had experienced racial discrimination ($OR = 2.181$, $CI = 1.152–4.130$) were more likely to report interpersonal disorders. Moreover, Moroccan workers who perceived high levels of rewards ($OR = 0.361$, $CI = 0.210–0.621$) were less likely to report this psychological outcome.

Furthermore, the group of migrant workers who favoured NA behaviours ($OR = 1.961$, $CI = 1.115–3.448$) were more likely to suffer anxious–depressive disorders, while Moroccan workers who favoured SI behaviours ($OR = 0.343$, $CI = 0.192–0.613$) were less likely to report this psychological outcome. Finally, concerning the associations between perceived work characteristics and psychophysical health conditions, migrant workers with a high perception of rewards ($OR = 0.339$, $CI = 0.172–0.668$) were less likely to suffer anxious–depressive disorders.

Concerning physical health conditions, perception of work stress ($OR = 2.241$, $CI = 1.169–4.296$) was associated with the risk of reporting poorer general health, while the recourse to emotional–relational coping ($OR = 0.288$, $CI = 0.130–0.638$) and the perception of high levels of rewards ($OR = 0.406$, $CI = 0.212–0.778$) and job satisfaction ($OR = 0.306$, $CI = 0.158–0.593$) were associated with significantly lower risk to suffer poor health.

In terms of interaction effects, only the interaction variable work demands racial discrimination in the prediction of interpersonal disorders was significant. Therefore, the group of Moroccan factory workers with a high perception of work demands associated with perceived racial discrimination ($OR = 2.875$, $CI = 1.437–5.436$) were more likely to report relational diseases.

Finally, the Z Sobel test using Hayes' (2013) process tool for SPSS was used to investigate whether appraisals (i.e., perceived work stress, perceived job satisfaction) mediate the relationship between work characteristics and health outcomes.

Table 7 reports the total, the direct and the indirect effects of work demands/work resources/rewards on health outcomes (i.e., anxious–depressive disorders, relational disorders, general health) via perceived work stress/perceived job satisfaction.

Table 7. Significant Effects of Appraisals in the Relationship between Work Characteristics and Health Outcomes

		Anxious-Depressive Disorders			Relational Disorders			General Health			
		Total Effect	Direct Effect	Indirect Effect	Total Effect	Direct Effect	Indirect Effect	Total Effect	Direct Effect	Indirect Effect	
Work demands via perceived work stress	Effect	0.2112	0.2077	0.0036	0.1105	0.1103	0.0002	0.2292	0.2890	0.0102	
	<i>p</i>	0.02	0.02	n.s.	n.s.	n.s.	n.s.	0.00	0.00	n.s.	
				(not significant)							
	<i>LLCI</i>	0.0334	0.0290	-0.0318	-0.0710	-0.2928	-0.0229	0.2105	0.2007	-0.0293	
	<i>ULCI</i>	0.3891	0.3863	0.0095	0.2921	0.0721	0.0190	0.3880	0.3773	0.0013	
Work resources via perceived work stress	Effect	-0.0758	-0.0698	-0.0060	-0.2122	-0.2138	0.0016	-0.1700	-0.1552	0.0027	
	<i>p</i>	n.s.	n.s.	n.s.	0.019	0.008	n.s.	0.003	0.008	n.s.	
		<i>LLCI (Lower Level Confidence Interval)</i>	-0.2516	-0.2471	-0.0375	-0.3895	-0.3926	-0.0208	-0.2608	-0.2458	-0.3650
		<i>ULCI (Upper Level Confidence Interval)</i>	0.1001	0.1074	0.0118	0.0349	-0.0350	0.0291	-0.0792	-0.0646	0.1012
Rewards via perceived work stress	Effect	-0.0964	-0.0908	-0.0057	-0.3005	-0.3030	0.0025	-0.3455	-0.3331	0.1248	
	<i>p</i>	n.s.	n.s.	n.s.	0.001	0.001	n.s.	0.000	0.003	n.s.	
		<i>LLCI</i>	-0.2761	-0.2718	-0.0369	-0.4804	-0.4844	-0.0179	-0.4529	-0.4204	-0.0091
		<i>ULCI</i>	0.0833	0.0903	0.0133	-0.1205	-0.1217	0.0334	-0.2502	-0.2459	0.2123

Work demands via perceived job satisfaction	Effect	0.2112	0.2000	0.0112	0.1105	0.1211	0.0106	0.2992	0.2891	0.0102
	<i>p</i>	0.02	0.027	n.s.	n.s.	n.s.	n.s.	0.000	0.000	n.s.
	<i>LLCI</i>	0.0334	0.0219	-0.0531	-0.2921	-0.3031	-0.0039	0.2105	0.2008	-0.0289
	<i>ULCI</i>	0.3891	0.3781	0.0028	0.0710	0.0608	0.0519	3880	0.3773	0.0016.
Work resources via perceived job satisfaction	Effect	-0.0758	-0.0887	0.0129	-0.2122	-0.2040	-0.0081	-0.1700	-0.1831	0.0131
	<i>p</i>	n.s.	n.s.	n.s.	0.019	0.024	n.s.	0.003	0.000	n.s.
	<i>LLCI</i>	-0.2516	-0.2646	-0.0024	-0.3895	-0.3819	-0.0436	-0.2608	-0.2727	-0.0031
	<i>ULCI</i>	0.1001	0.0872	0.0567	-0.0349	-0.0262	0.0051	-0.0792	-0.0934	0.0347
Rewards via perceived job satisfaction	Effect	-0.0964	-0.0795	-0.0169	-0.3005	-0.3188	0.0184	-0.3455	-0.3328	-0.0128
	<i>p</i>	n.s.	n.s.	n.s.	0.001	0.000	n.s.	0.000	0.000	n.s.
	<i>LLCI</i>	-0.2761	-0.2601	-0.0604	-0.4804	-0.4996	-0.0022	-0.4329	-0.4201	-0.0321
	<i>ULCI</i>	0.0833	0.1011	0.0013	-0.1205	-0.1381	0.0264	-0.2582	-0.2454	0.0020

Source: Capasso et al. (2016a).

Notes: n.s., not significant; LLCI, Lower Level Confidence Interval; ULCI, Upper Level Confidence Interval.

Taken together, these findings provide evidence that perceived work stress and perceived job satisfaction do not mediate the relationships between work demands/work resources/rewards and health outcomes.

Discussion

The EWS model provides a framework that illustrates how the interaction of psychosocial and individual variables can influence occupational health in different types of workers varying in ethnicity as well as the central role played by ethnicity, work characteristics and personality patterns in this multidimensional perspective.

The EWS analyses formed on selected basic principles from the DRIVE model confirmed its multidimensional conceptualisation, showing that all the dimensions involved, namely, IDs, work characteristics and appraisals, have main effects on health outcomes (Capasso et al., 2018). Therefore, the objective coping strategy was a protective factor reducing the risk of all health disorders. Also, the intrinsic and extrinsic rewards were associated with a lower risk of reporting interpersonal disorders and poor general health as well as perceived job satisfaction. On the other hand, the perception of high work demands was associated with higher risk of suffering all health disorders and the perception of high perceived job stress seemed to increase the specific risk of reporting anxious–depressive disorders.

Moreover, after testing the main effects of these independent variables, EWS proposed the personality behavioural pattern of Type A associated with higher risk of anxious–depressive disorders and poor general health and the integration with the ethnicity dimensions. Findings showed some significant associations with the inclusion of the ethnicity variables in terms of nationality/job, affirmation/maintenance culture, search identity/adoption of the host culture and perceived racial discrimination.

According to the literature on the stress models (by Job Demand Control [JDC], ERI and DRIVE models), our findings for the Moroccan factory workers suggested that with regard to individual characteristics, Type A behaviours, NA and SI were relevant in relationships to health outcomes; considering the work characteristics, rewards were particularly important, and in terms of appraisals, low job satisfaction/high stress was particularly associated with physical problems.

Looking in more detail at our sample, data confirmed the impact of psychosocial and perceived reward factors in accordance with the studies

conducted by Inoue et al. (2010), Jamal (1999), Kurz (2002), Li et al. (2007), London et al. (2002) and Milkie et al. (2004).

Considering the cultural dimensions, migrant factory workers who have many rules with respect to tradition and religion may have many difficulties in adopting the host culture and for this reason, they may have interpersonal disorders. Results on perceived discrimination were in accordance with the literature on this subject (Klonoff, Landrine, & Ullman, 1999; Roberts et al., 2004; Smith et al., 2005; Troxel, Matthews, Bromberger, & Sutton-Tyrrell, 2003).

Results related to Moroccan factory workers give a contribution to the EWS model (Capasso et al., 2018) suggesting a specific profile of associations.

Most of the Moroccan factory workers had a middle school education and temporary contracts for around €600/month. The disadvantageous conditions and inequalities that migrant workers face may be explained by the sectors and occupations where they are employed, rather than the fact they are migrants. In fact, in the current sample, the employment status of each ethnic group and certain aspects of the migrant population such as school education, genetic predispositions and body structure, behavioural patterns and previous working experience showed a significant link between country effects and occupational sectors and these results suggested further more detailed research on each ethnic group and relative control group to evaluate the influence of job type and ethnicity over the relationships between each work-related stress dimension and psychophysical health outcomes.

Considering associations between individual difference factors and occupational health, coping strategies and personality characteristics were differently associated with outcomes in the Moroccan factory workers with respect to the EWS model in the multi-ethnic sample as whole.

In fact, the important role reported by the emotional-relational coping strategy for the Moroccan factory workers does not correspond to the whole sample of migrant workers proposed by the EWS model where only the objective coping showed a significant and protective role for risk of health.

Furthermore, it is interesting that one of the Type D components, SI, decreased the likelihood of reporting psychological disorders while in the sample, as whole SI was associated with higher risk of anxious-depressive disorders. In regard to cultural dimensions of affirmation/maintenance culture acculturation strategy in reducing the risk of these psychological disorders, in Moroccan workers, ethnicity and related acculturation

strategies seem to influence the association between SI and this psychological outcome. In fact, the limited relationships of this ethnic minority with the host population are reflected in both personality characteristics and acculturation strategy, suggesting a potential interaction of this Type D aspect with the protective role of affirmation/maintenance culture strategy, which is useful in understanding in more detail whether these cultural and behavioural patterns could be considered as a defensive strategy for dealing with psychological problems.

Furthermore, in the prediction of interpersonal disorders, Type A behaviour was described as a factor that reduced the risk of reporting interpersonal disorders and it could be considered as an unexpected signal of integration because of the competitive aspects related to this behavioural pattern. This is based on the EWS general model where the personality behavioural pattern of Type A was associated with higher risk of anxious–depressive disorders and poor general health. Moreover, in accordance with the literature, Moroccan workers with high recourse to a search identity/adoption of the host culture strategy and who had experienced racial discrimination were more likely to report interpersonal disorders. It is also interesting that perceived racial discrimination at work exacerbates the effects of work demands on interpersonal disorders.

Findings on NA in Moroccan factory workers confirm the direction suggested by the literature as risk factors increasing health disorders (Parkes, 1994; Spector, 2003; Terry et al., 1993; Watson & Clark, 1984) and proposed a significant association between NA and health outcomes that the EWS general model does not reveal. In fact, findings for the sample as a whole reported the Type D component of NA as not significantly associated with health outcomes but tendentially in the same direction as suggested by literature.

Finally, concerning the dimensions influencing general health conditions, it emerged that emotional–relational coping and perceived job satisfaction reduce the risk of physical problems while perceived job stress was related to the risk of poorer general health.

It is noteworthy that emotional–relational coping, a search identity/adoption of the host culture and perceived racial discrimination were associated with lower perception of job satisfaction, while the perception of work resources increased the likelihood to perceive job satisfaction in accordance with Jamal (1999), Kurz (2002), London et al. (2002) and Milkie et al. (2004). Moreover, a search identity/adoption of the host culture was associated with higher risk of perceived job stress, while the perception of work resources reduced the likelihood to perceive job stress.

Considering the combined effects, for Moroccan workers the effects associated with exposure to negative occupational–cultural factor on anxious–depressive disorders, relational disorders and poor general health were linear. Therefore, the likelihood of suffering relational disorders was higher than the other two health conditions. This data confirm the psychological problems related to relationships at work reported in most of the studies among factory workers (Choi *et al.*, 2001; Inoue *et al.*, 2010; Seedat *et al.*, 2009) and the significant additive effects reported by the EWS model in contrast to the lack of mediating effects tested for the whole and Moroccan samples.

These findings supported the significant and specific profiles of the Moroccan factory workers giving an important contribution to the application of the EWS model and, at the same time, suggested a relevant framework useful in defining psychological interventions for promoting health in workplace to support these types of workers differing in ethnicity. Moreover, the model suggested also that vulnerable groups among migrant worker family members need to have specific programmes tailor made. These programmes have to be relevant to the structure and composition of each family and address their specific needs and vulnerabilities. This also needs to be done for members of the family according to their ages, sex and role in the family.

A prominent need observed within migrant worker families is the well-being and strengthening of the caregivers. This has been largely neglected and needs to have a stronger focus both for the well-being of the caregiver him/herself and also for the well-being of the child/children who is in her/his care. Access to counselling, which will help ease the stress, levels and provide psychosocial support to severely overburdened caregivers needs to be provided.

Limitations of the Present Study and Implications for Future Research

This type of approach is essential to consider different aspects of ethnicity giving closer attention to the acculturation strategies and perceived racial discriminations that influence the relationships between each work-related stress dimension and health outcome. However, the importance of the background in terms of values and social conditions of the host country is also relevant to define the position taken by the migrants and how they can deal with their minority status and lead to specific acculturation strategies.

Despite these results, the present study had several limitations. First, the risk of confounding work conditions with ethnicity represents a limitation due to the specific jobs covered by defined ethnic groups. Second, the cross-sectional design precludes any reference to temporal or causal directions of observed statistical associations. Moreover, these results suggested further, more detailed statistical methodologies to analyse the influence of job type and ethnicity over the relationships between each work-related stress dimension and psychophysical health outcomes in an ethnic group and relative control group. A meta-analysis should look in more detail at the potential confounding and individual difference variables, for example, age, working conditions, gender and personality. In fact, migrants work more often than native workers in sectors where working conditions are more strenuous and more physically stressful, and these different conditions can lead to specific psychophysical problems.

Third, the analyses only considered the presence/absence of physical diseases without looking in more detail at the different types of physical problems such as cardiovascular diseases, musculoskeletal diseases, dermatological diseases, respiratory diseases and gastric diseases. This suggests that one could improve the analyses by adopting an epidemiological approach.

In addition, in the current sample, the employment status of each ethnic group and certain aspects of the migrant population such as living conditions, school education, genetic predispositions and body structure, behavioural patterns and previous working experience might show a significant link between country effects and occupational sectors and these potential associations suggest further more detailed research on each ethnic group and relative control group to evaluate the influence of job type and ethnicity over the relationships between each work-related stress dimension and psychophysical health outcomes.

Finally, the recourse to the original subscales may give a contribution to the mediating and moderating effects, suggesting that dimensions, such as perceived racial discrimination and perceived stress, could exacerbate the effects of work characteristics in predicting health outcomes, while specific acculturation strategies, that is, affirmation/maintenance culture or coping strategies centred on emotional-relational coping, could moderate and report buffering effects on diseases.

Despite these limitations, our study reveals that the model, when applied to migrant workers, might give a contribution to the EWS research for future applications in the workplace, in particular on these indirect effects by improving the methodology to test buffering or increasing effects.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding

The authors received no financial support for the research, authorship and/or publication of this article.

References

- Berry, J. W. (1997). Immigration, acculturation, and adaptation. *Applied Psychology, 46*, 5–34. doi:10.1111/j.1464-0597.1997.tb01087.x
- Bluen, S. D., Barling, J., & Burns, W. (1990). Predicting sales performance, job satisfaction, and depression by using the achievement strivings and impatience-irritability dimensions of Type A behavior. *Journal of Applied Psychology, 75*, 212–216. doi:10.1.1.488.4770
- Bochhah, N. (2006). *Gediscrimineerd op de werkvloer, en dan...?* [Discrimination on the work floor: and then what?]. Rotterdam: Landelijk Bureau ter bestrijding van Rassendiscriminatie (LBR).
- Bortner, R. W. (1969). A short rating scale as a potential measure of pattern A behavior. *Journal of Chronic Disease, 22*, 87–91. doi:10.1016/0021-9681(69)90061-7
- Briner, R. B., Harris, C., & Daniels, K. (2004). How do work stress and coping work? Toward a fundamental theoretical reappraisal. *British Journal of Guidance & Counselling, 32*, 223–234. doi:10.1080/03069880410001692256
- Capasso, R. (2015). *Ethnicity and work-related stress: Migrant workers in southern Italy*. Naples, Italy: University of Naples ‘Federico II’.
- Capasso, R., Zurlo, M. C., & Smith, A. P. (2016a). Ethnicity and stress at work: A literature review and suggestions for future research. *British Journal of Education, Society & Behavioural Science, 15*, 1–20. doi:10.9734/BJESBS/2016/24340
- . (2016b). Work characteristics and occupational health in different ethnic groups. In P. Waterson, R. Sims, & E. Hubbard (Eds.), *Contemporary Ergonomics and Human Factors 2016: Proceedings of the International Conference on Ergonomics & Human Factors 2016, Daventry, Northamptonshire, UK, 19–21 April 2016* (pp. 160–166). London: Taylor & Francis.
- . (2018). Ethnicity, work-related stress and subjective reports of health by migrant workers: A multi-dimensional model. *Ethnicity & Health, 23*(2), 174–193. doi:10.1080/13557858.2016.1258041
- Carballo, M., Divino, J. J., & Zeric, D. (1998). Migration and health in the European Union. *Tropical Medicine & International Health, 3*, 936–944.
- Chia, S. E., Chia, K. S., & Ong, C. N. (1991). Ethnic differences in blood lead concentration among workers in a battery manufacturing factory. *Annals of the Academy of Medicine, 20*(6), 758–761.

- Chia, S. E., Chia H. P., Ong C. N., & Jeyaratnam, J. (1996). Cumulative blood lead levels and nerve conduction parameters. *Occupational Medicine*, *46*, 59–64. doi:10.1093/occmed/46.1.59
- Choi, S. K., Lee, M. H., & Chung, G. H. (2001). Competition in Korean mobile telecommunications market: Business strategy and regulatory environment. *Telecommunications Policy*, *25*(1), 125–138.
- Cooper, C. L., Sloan, S. J., & Williams, S. (1988). *Occupational stress indicator*. Windsor: NFER Nelson.
- Denollet, J. (2005). DS14: Standard assessment of negative affectivity, social inhibition, and type D personality. *Psychosomatic Medicine*, *67*, 89–97. doi:10.1097/01.psy.0000149256.81953.49
- Derogatis, L. R. (1994). *Symptom checklist 90–R: Administration, scoring, and procedures manual* (3rd ed.). Minneapolis, MN: National Computer Systems.
- Dua, J. K. (1994). Job stressors and their effects on physical health, emotional health, and job satisfaction in a university. *Journal of Educational Administration*, *32*, 59–78. doi:10.1108/09578239410051853
- Edwards, J. R., Baglioni, A. J., & Cooper, C. L. (1991). Examining the relationships among self-report measures of the Type A behavior pattern: The effects of dimensionality, measurement error, and differences in underlying constructs: Correction. *Journal of Applied Psychology*, *76*, 644–657. doi:10.1037/0021-9010.76.5.644
- Emerson, K. T. U., & Murphy, M. C. (2014). Identity threat at work: How social identity threat and situational cues contribute to racial and ethnic disparities in the workplace. *Cultural Diversity and Ethnic Minority Psychology*, *20*, 508–520. doi:10.1037/a0035403
- Eurofound. (2008). *European foundation for the improvement of living and working conditions* (Annual Report). Dublin: Annexes, Eurofound.
- Ganster, D. C., Schaubroeck, J., Sime, W. E., & Mayes, B. T. (1991). The nomological validity of the Type A personality among employed adults. *Journal of Applied Psychology*, *76*, 143–168. doi:10.1037/0021-9010.76.1.143
- Giga, S., & Hoel, H. (2006, June 15–17). Is it racial discrimination or bullying? An exploration into the relationship between racial background and experiences of workplace bullying. In *Proceedings of the Fifth International Conference on Bullying and harassment in the Workplace* (pp. 82–84). Dublin, Ireland: CRC Press.
- Gliber, M. (2004). Migration & health in France. In A. Huismann, C. Weilandt & A. Geiger (Eds.), *Country reports on migration and health in Europe* (pp. 106–155). Bonn: Wissenschaftliches Institut der Ärzte Deutschlands e V.
- Hayes, A. F., & Preacher, K. J. (2013). Conditional process modeling: Using structural equation modeling to examine contingent causal processes. In G. R. Hancock & R. O. Mueller (Eds.) *Structural equation modeling: A second course* (2nd ed., pp. 219–266). Greenwich, CT: Information Age Publishing.
- Hayes, A. F., Preacher, K. J., & Myers, T. A. (2011). Mediation and the estimation of indirect effects in political communication research. In E. P. Bucy & R. L.

- Holbert (Eds.), *Sourcebook for political communication research: Methods, measures, and analytical techniques* (pp. 434–465). New York, NY: Routledge.
- Hodgkins, D. G., Hinkamp, D. L., Robins, T. G., Schork, M. A., & Krebs, W. H. (1991). Influence of high past lead-in-air exposures on the lead-in-blood levels of lead-acid battery workers with continuing exposure. *Journal of Occupational Medicine*, *33*, 797–803. doi:10.1097/00043764-199107000-00013
- Hoel, H., & Cooper, C. (2000). *Destructive conflict and bullying at work*. Manchester: University of Manchester Institute of Science and Technology (UMIST).
- Inoue, A., Kawakami, N., Ishizaki, M., Shimazu, A., Tsuchiya, M., Tabata, M., et al. (2010). Organizational justice, psychological distress, and work engagement in Japanese workers. *International Archives of Occupational and Environmental Health*, *83*(1), 29–38.
- International Labour Organization (ILO). (2004). *Global strategy on occupational safety and health*. Geneva: Author.
- Italian National Institute of Statistics (ISTAT). (2014). *Stima rapida della popolazione*. Rome: ISTAT.
- Ivancevich, J. M., & Matteson, M. T. (1988). Type A behaviour and the healthy individual. *British Journal of Medical Psychology*, *61*, 37–56.
- Jamal, M. (1999). Job stress and employee well-being: A cross-cultural empirical study. *Stress Medicine*, *15*, 153–158. doi:10.1002/(SICI)1099-1700(199907)15:3
- Karasek, R. A. (1985). *Job content questionnaire and user's guide*. Lowell, MA: University of Massachusetts.
- Karlsen, S., Nazroo, J. Y., McKenzie, K., Bhui, K., & Weich, S. (2005). Racism, psychosis and common mental disorder among ethnic minority groups in England. *Psychological Medicine*, *35*(12), 1795–1803.
- Klonoff, E. A., Landrine, H., & Ullman, J. B. (1999). Racial discrimination and psychiatric symptoms among blacks. *Cultural Diversity and Ethnic Minority Psychology*, *5*, 329–339. doi:10.1037//1099-9809.5.4.329
- Krings, F., Johnston, C., Binggeli, S., & Maggiori, C. (2014). Selective incivility: Immigrant groups experience subtle workplace discrimination at different rates. *Cultural Diversity and Ethnic Minority Psychology*, *20*, 491–498. doi:10.1037/a0035436
- Kurz, D. (2002). *Poor urban mothers and the care of teenage children*. New York, NY: Routledge.
- Lee, A. L., Ogle, W. O., & Sapolsky, R. M. (2002). Stress and depression: Possible links to neuron death in the hippocampus. *Bipolar Disorders*, *4*, 117–128. doi:10.1034/j.1399-5618.2002.01144.x
- Levin, I., & Stokes, J. P. (1989). Dispositional approach to job satisfaction: Role of negative affectivity. *Journal of Applied Psychology*, *74*(5), 752–758.
- Lehman, D. R., Chiu, C. Y., & Schaller, M. (2004). Psychology and culture. *Annual Review of Psychology*, *55*(1), 689–714.

- Li, L., Wang, H. M., Ye, X. J., Jiang, M. M., Lou, Q. Y., & Hesketh, T. (2007). The mental health status of Chinese rural-urban migrant workers: Comparison with permanent urban and rural dwellers. *Social Psychiatry and Psychiatric Epidemiology*, *42*, 716–722. doi:10.1007/s00127-007-0221-0
- Lind, S. L., & Otte, F. L. (1994). Management styles, mediating variables, and stress among HRD professionals. *Human Resource Development Quarterly*, *5*, 301–316. doi:10.1002/hrdq.3920050403
- Linnabery, E., Stuhlmacher, A. F., & Towler, A. (2014). From whence cometh their strength: Social support, coping, and well-being of black women professionals. *Cultural Diversity and Ethnic Minority Psychology*, *20*, 541–549. doi:10.1037/a0037873
- London, A. S., Scott, E. K., & Hunter, V. (2002). *Health-related carework for children in the context of welfare reform*. New York, NY: Routledge.
- Long, B. C., Kahn, S. E., & Schutz, R. W. (1992). A causal model of stress and coping: Women in management. *Journal of Counseling Psychology*, *39*, 227–239. doi:10.1037/0022-0167.45.1.65
- Mark, G. M., & Smith, A. P. (2008). *Stress models: A review and suggested new direction*. In J. Houdmont & Leka, S. (Eds.), *Occupational health psychology* (pp. 111–144). Nottingham: Nottingham University Press.
- Mark, G., & Smith, A. P. (2012a). Effects of occupational stress, job characteristics, coping, and attributional style on the mental health and job satisfaction of university employees. *Anxiety, Stress & Coping*, *25*, 63–78. doi:10.1080/10615806.2010.548088
- . (2012b). Occupational stress, job characteristics, coping, and the mental health of nurses. *British Journal of Health Psychology*, *17*, 505–521. doi:10.1111/j.2044-8287.2011.02051.x
- McGinnity, F., O’Connell, P., Quinn, E., & Williams, J. (2006). *Migrants experience of racism and discrimination in Ireland*. Dublin: The Economic and Social Research Institute (ESRI).
- McKay, S. (2007). *Migrant workers and health and safety* (pp. 9–10). Brussels: ETUI-HESA.
- Mghari, M., & Fassi Fihri, M. (2010). *Cartographie des flux migratoires des Marocains en Italie*. Geneva: IOM.
- Milkie, M. A., Mattingly, M. J., Nomaguchi, K. M., Bianchi, S. M., & Robinson, J. P. (2004). The time squeeze: Parental statuses and feelings about time with children. *Journal of Marriage and Family*, *66*, 739–761. doi:10.1111/j.0022-2445.2004.00050.x
- Moran, P. A. (1999). The epidemiology of personality disorder. *Social Psychiatry and Psychiatric Epidemiology*, *34*, 231–242. doi:10.1007/s001270050138
- Murphy, L. R. (1995). Managing job stress: An employee assistance/human resource management partnership. *Personnel Review*, *24*, 41–50. doi:10.1108/00483489510079075
- Nazroo, J. Y. (2003). The structuring of ethnic inequalities in health: economic position, racial discrimination and racism. *American Journal of Public Health*, *93*, 277–284. doi:10.2105/AJPH.93.2.277

- NIOSH. (1999). *Stress at work* (pp. 99–101). Cincinnati: National Institute for Occupational Safety and Health.
- Noh, S., & Kaspar, V. (2003). Perceived discrimination and depression: Moderating effects of coping, acculturation, and ethnic support. *American Journal of Public Health, 93*(2), 232–238.
- Parkes, K. (1994). Personality and coping as moderators of work stress processes: Models, methods and measures. *Work & Stress, 8*, 110–129. doi:10.1037/1076-8998.8.1.20
- Phinney, J. (1992). The multigroup ethnic identity measure: A new scale for use with diverse groups. *Journal of Adolescent Research, 7*, 156–176. doi:org/10.1037/0003-066X.51.9.918
- Prunas, A., Sarno, I., Preti, E., & Madeddu, F. (2010). SCL-90-R. *Symptom Checklist 90-R*. Firenze: Giunti OS.
- Redfield, R., Linton, R., & Herskovits, M.J. (1936). Memorandum for the study of acculturation. *American Anthropologist, 38*, 149–152.
- Roberts, R. K., Swanson, N. G., & Murphy, L. R. (2004). Discrimination and occupational mental health. *Journal of Mental Health, 13*, 129–142. doi:10.1080/09638230410001669264
- Rosenman, R. H. (1991). Type A behavior pattern and coronary heart disease: The hostility factor. *Stress Medicine, 7*, 245–253. doi:10.1002/smi.2460070407
- Seedat, S., Scott, K. M., Angermeyer, M. C., Berglund, P., Bromet, E. J., Brugha, T. S., Kessler, R. C. (2009). Cross-national associations between gender and mental disorders in the World Health Organization world mental health surveys. *Archives of General Psychiatry, 66*, 785–795. doi:10.1001/archgenpsychiatry.2009.36
- Semmer, N. K. (2003). Individual differences, work stress and health. In M. J. Schabracq, J. A. M. Winnubst, & C. L. Cooper (Eds.), *The handbook of work and health psychology* (2nd ed., pp. 83–120). Chichester: Wiley.
- Siegrist, J. (1996). Adverse health effects of high-effort/low-reward conditions. *Journal of Occupational Health Psychology, 1*, 27–41. doi:10.1037/1076-8998.1.1.27
- Smith, A., Johal, S., Wadsworth, E., & Peters, T. (2000). *The scale and impact of occupational stress: The bristol stress and health at work study* (Health & Safety Executive Research Report 265). London: HSE Books.
- Smith, A., Wadsworth, E., Shaw, C., Stansfeld, S., Bhui, K., & Dhillon K. (2005). *Ethnicity, work characteristics, stress and health* (Health & Safety Executive Research Report 308). London: HSE Books.
- Sornprasit, S. (2001). *The basic need of buying housing development in Chiang Mai in 2001. Independent Study* (Master of Economics). Thailand: Chiang Mai University.
- Spector, P.E. (2003). Individual differences in health and well-being in organizations. In D. A. Hoffman & L. E. Tetrick (Eds.), *Health and safety in organizations: A multilevel perspective* (pp. 29–55). San Francisco, CA: Jossey-Bass.
- Spence, J. T., Helmreich, R. L., & Pred, R. S. (1987). Impatience versus achievement striving in the Type A pattern: Differential effects on student's

- health and academic achievement. *Journal of Applied Psychology*, 4, 522–528. doi:10.1037/0021-9010.72.4.522
- Szczepura, A., Gumber, A., Clay, D., Davies, R., Elias, P., Johnson, M. et al. (2004). *Review of the occupational health and safety of Britain's ethnic minorities* (Health & Safety, Executive Research Report 221). London: HSE Books.
- Terry, D. J., Nielsen, N., & Perchard, L. (1993). Effects of work on psychological well-being and job satisfaction: The stress-buffering role of social support. *Australian Journal of Psychology*, 45(3), 168–175.
- Troxel, W. M., Matthews, K. A., Bromberger, J. T., & Sutton-Tyrrell, K. (2003). Chronic stress burden, discrimination, and subclinical carotid artery disease in African American and Caucasian women. *Health Psychology*, 22, 300–309. Retrieved from <http://dx.doi.org/10.1037/0278-6133.22.3.300>
- Warr, P., Cook, J., & Wall, T. (1979). Scales for the measurement of some work attitudes and aspects of psychological well-being. *The Journal of Occupational Psychology*, 52, 129–148. doi:10.1111/j.2044-8325.1979.tb00448.x
- Watson, D., & Clark, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin*, 96(3), 465–490.
- Werner, H. (2001). *From guests to permanent visitors? From the German guest worker programme of the sixties to the current ('Green Card' Initiative for IT Specialists)*. Institut für Arbeitsmarkt- und Berufsforschung. Nürnberg: OECD.
- Zurlo, M. C., & Pes, D. (2012). Effort-Reward Imbalance e salute psicofisica degli insegnanti. *Giornale Italiano di Medicina del lavoro ed ergonomia*, 34(2), B81–B87.
- Zurlo, M. C., Pes, D., & Siegrist, J. (2010). Validity and reliability of the effort—Reward imbalance questionnaire in a sample of 673 Italian teachers. *International Archives of Occupational Environmental Health*, 83, 665–674. doi:10.1007/s00420-010-0512-8
- Zurlo, M. C., Pes, D., & Capasso, R. (2013). Teacher stress questionnaire: Validity and reliability study in Italy. *Psychological Reports*, 113, 1–28. doi:10.2466/03.16.PR0.113x23z9

Authors' Bio-sketch

Roberto Capasso is PhD in Psychological and Pedagogical Science. His research interest covers the area of occupational and health psychology and the cross-cultural approach. His research project on 'Ethnicity and work related stress' is a collaboration between the University of Naples 'Federico II' and Cardiff University, Centre for Occupational and Health Psychology. It focuses on stress in migrant workers proposing

comparisons across different ethnic groups and different professions and modelling the effects of multiple variables on psychological ill health among these types of workers. Specifically, he proposed a multidimensional model of stress that integrates ethnicity and work-related stress dimensions in a transactional perspective combining individual differences, ethnicity aspects and work characteristics in the prediction of psychophysical health outcomes and giving closer attention to specific associations among cultural dimensions such as discrimination experiences, cultural identity, acculturation strategies and health outcomes among workers.

Maria CLelia Zurlo is an Associate Professor of psychopathology and psychodiagnosis at the Department of Political Sciences, University of Naples Federico II, Italy. She studied at University of Naples Federico II, at University of Rome La Sapienza, Italy, and at University Lumière Lyon 2, Lyon, France. She received her doctorate from University of Naples Federico II, Italy. Her research interests include models and tools for the evaluation of work-related stress dimensions and psychological and physical health conditions of teachers, immigrant workers and nurses.

Andrew Peter Smith is Director of COHP (Cardiff University). His research covers the areas of occupational and health psychology with major emphasis being on well-being. Specifically, he has conducted extensive research on the non-auditory effects of noise on cognition and health. In addition, he conducted research on stress and fatigue in both workplace and life in general. His interests in health psychology cover two main themes: health-related behaviours (effects of nutrition, caffeine and chewing gum on behaviour) and minor illnesses (psychosocial risk factors for susceptibility to colds and influenza; effects of upper respiratory tract infections on mood and cognition).