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## Article

# Does an advantageous occupational position make women happier in contemporary Japan? Findings from the Japanese Study of Health, Occupation, and Psychosocial Factors Related Equity (J-HOPE)



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## ARTICLE INFO

## Article history:

Received 23 June 2015

Received in revised form

24 August 2015

Accepted 12 September 2015

## Keywords:

Gender inequalities

Psychological health

Psychosocial work characteristics

Effort–reward imbalance

Japan

The Japanese study of Health, Occupation and Psychosocial factors related Equity (J-HOPE)

## ABSTRACT

Occupational position is one of the determinants of psychological health, but this association may differ for men and women depending on the social context. In contemporary Japanese society, occupational gender segregation persists despite increased numbers of women participating in the labour market, which may contribute to gender specific patterns in the prevalence of poor psychological health. The present study examined gender specific associations between occupational position and psychological health in Japan, and the potential mediating effects of job control and effort–reward imbalance in these associations. We used data obtained from 7123 men and 2222 women, aged between 18 and 65 years, who participated in an occupational cohort study, the Japanese Study of Health, Occupation, and Psychosocial Factors Related Equity (J-HOPE), between 2011 and 2012. We used logistic regression to examine the association between occupational position and poor psychological health, adjusted for age, working hours, household income and education, as well as psychosocial work characteristics (job control and effort–reward imbalance). The prevalence of poor psychological health increased from manual/service occupations (23%) to professionals/managers (38%) among women, while it did not vary by occupational position among men. In women, the significant association between occupational position and psychological health was not explained by job control, but was attenuated by effort–reward imbalance. Our findings suggest that Japanese women in more advantaged occupational positions are likely to be at a greater risk for poor psychological health due to higher levels of effort–reward imbalance at work.

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## 1. Introduction

The psychological health of workers is a great policy concern in Japan, where increased productivity is critical to maintaining the fiscal health of the social security system in an aging society (Brinton, 1993; Shire, 2008). Occupational position is known to be a determinant of psychological health, but evidence suggests that

it may have a stronger association with psychological health for men than women, particularly in the Japanese context (Sekine, Chandola, Martikainen, Marmot, & Kagamimori, 2006; Sekine, Chandola, Martikainen, Marmot, & Kagamimori, 2009). Literature indicated that gender inequality in the labour market may contribute to gender specific patterns in the prevalence of poor psychological health (Palència et al., 2014; Seedat et al., 2009; Sekine et al., 2009). Nevertheless, previous study of the potential role of psychosocial work characteristics in gender specific association of psychological health among Japanese workers have so far been restricted to job control amongst civil servants (Sekine et al., 2006, 2009). The aims of this study was to examine gender specific associations between occupational position and psychological health in Japan, and the potential mediating effects of job control and effort–reward imbalance in these associations.

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### 1.1. Work and gender in Japan

In Japan, as in many countries, the male-breadwinner model became pervasive during the 20th Century (Crompton, 2006; Shire, 2008). Economic growth started in the late 1970s and succeeding economic recession motivated Japanese firms to hire greater quantities of part-time workers at low wages, many of them were women who were single or childless, or who returned to labour market after their raising children (Edwards, 1994; Shire, 2008). In 1986, the Japanese government enacted the Equal Employment Opportunity (EEO) Law under pressure from the International Labour Organization. This law aimed to abolish any difference in treatment between men and women in recruitment, training, task assignment, or remuneration (Kumamoto-Healey, 2005).

However, women in Japan remain more likely than men to be in insecure work with few prospects for career advancement (Futagami, 2010) and men are still favoured for promotion opportunities and wage-gain (Abe, 2010; Benson, Yuasa, & Debroux, 2007; Nakata & Takehiro, 2002; Ogiwara, Tsuda, Akiyama, & Sakai, 2008). In Japan, job performance is traditionally evaluated by high level of commitment to the firms, which is demonstrated by accepting long working hours and frequent relocation as well as by length of service (Benson et al., 2007; Kumamoto-Healey, 2005). This culture may have resulted in the devaluation of female employees whose time commitment is more likely to be limited by family responsibilities. In addition, women in a senior occupational position were often experience great tension from the discrepancy between their occupational position and traditional gender role. Ogiwara et al. (2008) found that female Japanese workers who strived for occupational achievement were criticised by their male colleagues and partner for opposing the traditional female gender role expectations of prioritising the maintenance of harmonious relationships over their own professional performance.

The aim of this study was two-fold. First, we examined gender-specific associations between occupational position and psychological health in contemporary Japanese society. Given previous evidence, we hypothesised that an occupational gradient in psychological health would be observed for men, with better psychological health amongst those in more advantaged occupational positions, but not in women (Sekine et al., 2009). Secondly, we assessed the role of psychosocial work characteristics in the associations. We hypothesised that psychosocial work characteristics, such as low job control and high effort–reward imbalance, would account for the occupational gradient of psychological health in men. On the other hand, we assumed that the absence of occupational gradient in women was explained by the lack of advantageous psychosocial work characteristics in higher position among women.

## 2. Methods

### 2.1. Participants

We used cross-sectional data from the second wave of the Japanese Study of Health, Occupation, and Psychosocial Factors Related Equity (J-HOPE), as it was the most recent wave available at the time of this work (July, 2014). J-HOPE administered four phases of data collection between 2010 and 2014 from a panel of Japanese workers, aiming at investigating social determinants of health among Japanese workers (Tsutsumi, 2013). It recruited participants from 12 companies in a variety of industries such as manufacturing, information technology, transportation, service, pharmaceutical, and medical industries. At the first wave (conducted October 2010

and December 2011), 10,807 employees participated (response rate=77.4%). The second wave was conducted between 2011 and 2012 (follow-up rate=79.5%), with those who did not respond to the first survey invited to participate. This resulted in 11,903 respondents (9006 men and 2897 women) after excluding the respondents who did not give information about their gender ( $N=2241$ ). We selected respondents aged between 18 and 65 years (8485 men and 2868 women), and excluded 1966 respondents who had missing information on any of the study variables, including those who reported their occupation as “others” (1335 men and 631 women). We further excluded 42 respondents who had two or more missing responses to the subscales of effort–reward imbalance and job control measures (27 men and 15 women). This resulted in a final study sample of 9345 (7123 men and 2222 women). Data were collected through a self-administered questionnaire. Written informed consent was obtained from the participants prior to the data collection.

### 2.2. Measures

#### 2.2.1. Psychological health

As the outcome, we assessed psychological health using the Kessler-6 (K6), which measures non-specific psychological distress across different types of serious mental illness (Kessler et al., 2002). A previous study validated K6 among Japanese workers, showing concordance with mood and anxiety disorders through the Composite International Diagnostic Interview based on the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV) (Furukawa et al., 2008). Respondents were asked to rate the frequency of six types of psychological states (e.g. sadness, nervousness, restless and hopeless) in the past 30 days with a five-point Likert scale (0=none of the time, 1=a little of the time, 2=some of the time, 3=most of the time, and 4=all of the time). The total score ranges from 0 to 24. We used the cut-point of 9 or above as having poor psychological health (Furukawa et al., 2008). Cronbach's alpha coefficient of K6 in this sample was 0.90 for both genders.

#### 2.2.2. Occupational position

We used the classification of occupational position based on International Standard Classification of Occupation (ISCO), which classifies occupations based on skill level and skill specialisation (International Labour Organization, 2012). We further classified the ISCO groups into three ordered occupational groups in relation to employment relations of the participants, including levels of authority, specialized knowledge and expertise, and career opportunities in each occupation, based on the National Statistics Socio-economic Classification (Rose & Pevalin, 2005): (1) professional/managerial; (2) associate professional/clerical; and (3) service/manual. The ‘service/manual’ group was used as the reference group in all models.

#### 2.2.3. Job control

Job control was measured using nine items from the Japanese version of the Job Content Questionnaire (JCQ) (Kawakami, Kobayashi, Araki, Haratani, & Furui, 1995). The Japanese version of the JCQ was validated among Japanese workers (Kawakami et al., 1995; Kawakami & Fujigaki, 1996). In this sample, Cronbach's alpha coefficients of this scale were 0.77 for men and 0.73 for women. Respondents were asked to rate their decision latitude at work, “1” (being totally disagree) and “4” (being totally agree), in two dimensions: decision-making authority (3 items) and skill discretion opportunity (6 items). Following guidelines (Karasek, 1985), we calculated the total score giving equal weight to these two dimensions. We imputed missing values by using the respondent's mean subscale score if the respondent missed only

one item on the corresponding subscale (Bosma et al., 1997). The total score ranges from 24 to 96, and a higher score indicates more job control. In this study, we defined the lowest tertile as 'low job control' and compared this with the remaining two tertiles combined which were treated as the reference group.

#### 2.2.4. Effort–reward imbalance

Effort–reward imbalance at work was measured using 10 items from the Japanese short version of the Effort–Reward Imbalance Questionnaire; three items for work demands (effort), and seven items for esteem, job security, job promotion and salary at work (reward) (Kurioka, Inoue, & Tsutsumi, 2014). A previous study validated the Japanese short version in a Japanese working population (Kurioka et al., 2014; Tsutsumi, Ishitake, Peter, Siegrist, & Matoba, 2001). Respondents were asked to rate how much the content of each item described their typical experience of their work situation (1=totally disagree to 4=totally agree; score range: 3–12 for effort, 7–28 for reward). We imputed the missing value by using the respondent's mean item score of the subscale if respondents did not answer one item in a subscale (Bosma et al., 1997). In this sample, Cronbach's alpha coefficients of effort items were 0.77 for men and 0.78 for women, those of reward items were 0.76 for men and 0.70 for women. Effort–reward imbalance is a ratio of the effort score to the reward score, where the sum of each score is weighted to adjust for the different numbers of items in the two subscales (Siegrist, Wege, Pühlhofer, & Wahrendorf, 2009). We defined the highest tertile as having "high effort–reward imbalance", and created a dichotomous variable by combining the remaining two tertiles as the reference group.

#### 2.2.5. Co-variables

We included age, gender, working hours, education, and household income as co-variables. We used age as a continuous variable. We dichotomized working hours at 30 h per week to indicate full-time or part-time work (Ministry of Health, Labour and Welfare, 2011). We also dichotomized educational attainment into "with a higher degree (Junior college or higher)" and "without a higher degree" (reference group). Annual household income before deduction of tax was used as a marker of material standard of living in this study. Study participants were asked to indicate their gross annual household income from six income bands. These were combined into tertiles, taking the lowest tertile as the reference group.

#### 2.3. Statistical analysis

We first examined the gender–occupation interaction in a model predicting psychological health adjusting for age and working hours using logistic regression to examine whether the association between occupational position and psychological health was gender specific. We also conducted sensitivity analysis to see whether the heterogeneity of participants by company would affect our findings because the proportion of occupational position, full-time workers, and age groups differed by company. We repeated the logistic regression models that examined the association between occupational positions and poor psychological health, removing participants from each company one by one. The results yielded almost identical results to the model that used the pooled data of all participating companies (data is available upon request).

Next, we examined the unadjusted prevalence of poor psychological health, low job control and high effort–reward imbalance by occupational position, separately for men and women. We tested the presence of a linear trend in the associations using the Cochran–Armitage trend test (two-sided). Then, we examined the association between occupational position and psychological

health using logistic regression, hierarchically adjusted for possible covariates, separately in men and women. In the first model, we examined the association between occupational position and psychological health adjusting for age and working hours (Model 1). We then controlled for education and household income (Model 2). Finally, we entered job control (Model 3) and effort–reward imbalance (Model 4) separately to Model 2 to assess the role of psychosocial work characteristics as possible mediators for the association between occupational position and psychological health. The overall association between psychological health and each study variable was assessed using the likelihood ratio test for the Type III analysis of effects, which examines a null hypothesis that all the individual coefficients of the variable set would be equal to zero. All analyses were conducted using the SAS statistical package version 9.3 (SAS Institute, Cary, NC, USA).

The ethics committee of the University of Tokyo Graduate School of Medicine/Faculty of Medicine (No. 2772), Kitasato University School of Medicine/Hospital (B12-103), and University of Occupational and Environmental Health (10-004), Japan, approved the contents and procedure of this study. Written informed consent was obtained from the participants prior to the data collection.

### 3. Theory

Campos-Serna, Ronda-Perez, Artazcoz, Moen, and Benavides (2013) described two types of gender inequality in occupations: 'horizontal' and 'vertical' occupational divisions. Horizontal division refers to the unequal distribution of occupational position between men and women, while vertical division refers to the unequal distribution of tasks, authority, and career opportunities between men and women within the same occupational position. As more women have entered occupations that have previously been dominated by men in Japan and elsewhere (Cabinet Office, 2014; Feuvre, 2010), horizontal occupational differences between men and women may become less salient. On the other hand, vertical occupational division would continue to exist if gendered social norms and practices contribute to the gender inequality in work characteristics (Campos-Serna et al., 2013). Based on this assumption, we hypothesised that the association of occupational positions with psychological health was gender specific in contemporary Japan, because the distribution of work-related psychosocial stressors would differ between genders due to the persistence of gendered norms and practices in the Japanese society.

### 4. Results

Table 1 shows the characteristics of the study participants by gender. Occupational position differed significantly by gender. Compared to women, men were more likely to be manual/service workers and professionals/managers, and were less likely to be clerks and associate-professionals. Men were also much less likely to work part-time compared to women, and were more likely to have a higher degree than women. Half of women were in the lowest tertile of household income, compared with a little over a quarter of men. Poor psychological health was more prevalent in women than in men at 29% compared with 22% respectively. Women reported lower job control more than men, with over 45% of women reporting low job control compared with a little over a quarter of men. High effort–reward imbalance was slightly more prevalent among women (34%) compared to men (32%).

The test for a gender–occupation interaction showed that the association between occupational position and psychological health differed significantly between men and women at 0.05 level (results are not shown). This result supported our assumption that the

**Table 1**  
Characteristics in J-HOPE by men and women.

	Men (N=7123) (%)	Women (N=2222) (%)	
Age (mean)	41.3 (SD=10.7)	37.8 (SD=10.5)	$t=13.4^{***}$
Occupation			$\chi^2=219.3^{***}$
Manual/service	35.1	27.6	
Clerical/associate prof.	25.3	41.7	
Professional/managerial	39.6	30.7	
Education			$\chi^2=160.4^{***}$
Without higher degree	50.9	66.2	
Higher degree	49.1	33.8	
Household income			$\chi^2=415.6^{***}$
Low	27.0	50.1	
Middle	39.3	28.2	
Higher	33.8	21.7	
Working less than 30 h/week	5.8	20.9	$\chi^2=454.1^{***}$
Poor psychological health	22.0	28.8	$\chi^2=42.3^{***}$
Job control			$\chi^2=72.2^{***}$
Low	27.7	46.6	
Middle	38.3	34.3	
High	34.0	19.1	
Effort–reward imbalance			$\chi^2=6.6^*$
Low	32.8	33.7	
Middle	35.2	32.3	
High	32.0	34.0	

*t*-Test for age means and chi-squared test for distributions (two-sided). DF=1 for education, working hours, poor psychological health, and DF=2 for occupation, household income, job control and effort–reward imbalance. Higher degree was defined as Junior college or higher degree.

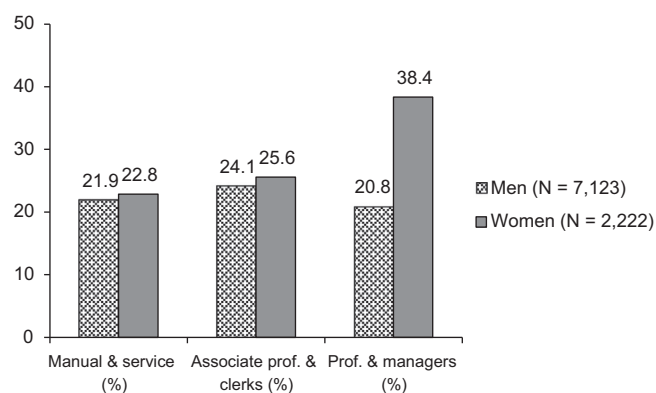
\*  $p < 0.05$ .

\*\*\*  $p < 0.001$ .

association between occupational position and psychological health was gender specific, and we stratified gender in the subsequent analyses.

The prevalence of poor psychological health in relation to participants' occupational position is presented graphically in Fig. 1. For women, poor psychological health was more prevalent among professionals/managers compared with other occupations, but there was no significant difference in the prevalence of psychological health for men according to their occupational position. A significant linear trend in poor psychological health across occupational position was found in women ( $p < 0.001$ ), but not in men.

Table 2 shows the prevalence of psychosocial work characteristics by occupational position in men and women. In both genders, there was a clear occupational gradient in low job control with greatest prevalence amongst those in manual or service occupations ( $p < 0.001$  for linear trend in both men and women). In every occupational group, more women had lower job control than men. Similar to the relationship between occupational position and psychological health, the prevalence of effort–reward imbalance increased from manual/service workers to professionals/managers in women. On the other hand, the prevalence of high effort–reward imbalance was similar across occupational

**Fig. 1.** Prevalence of poor psychological health (K6 9+) across occupational position by men and women. Cochran–Armitage trend test:  $Z=1.0$  in men ( $p=0.3$ ), and  $Z=-6.3$  in women ( $p < 0.001$ ).**Table 2**

Distribution of psychosocial characteristics by occupations among men ( $N=7123$ ) and women ( $N=2222$ ) in the J-HOPE.

	Low control (%)	High effort–reward imbalance (%)
<b>Men</b>		
Manual/service	46.6	31.2
Clerical/associate prof.	21.7	33.0
Prof./managerial	14.9	32.1
$Z^a$	25.5 <sup>***</sup>	-0.7
<b>Women</b>		
Manual/service	70.8	22.2
Clerical/associate prof.	45.5	31.4
Prof./managerial	26.4	48.0
$Z^a$	16.0 <sup>***</sup>	-9.9 <sup>***</sup>

<sup>a</sup> Cochran–Armitage trend test.

\*\*\*  $p < 0.001$

groups in men. The linear trend in this association was significant in women ( $p < 0.001$ ), but not in men.

Table 3 shows the results of multiple logistic regression models in men. Occupational position was not significantly associated with psychological health in men (Model 1). Once differences in household income and education were accounted for in the model, associate professionals/clerks and professionals/managers became slightly more likely than those in manual/service occupations to report poor psychological health; however, this only reached statistical significance for the associate professionals/clerks (OR=1.17, 95% CI=1.00–1.37), and the overall association between occupation and psychological health was not statistically significant. When we additionally entered job control in the model (Model 3), both professionals/managers (OR=1.35, 95% CI=1.14–1.60) and associate professionals/clerks (OR=1.33, 95% CI=1.14–1.56) were significantly more likely than manual/service workers to have poor psychological health. The overall association between occupational position and poor psychological health became statistically significant. On the other hand, the adjustment for effort–reward imbalance diminished the association between occupational position and psychological health (Model 4). Low job control and high effort–reward imbalance both had a positive independent association with poor psychological health over and above occupational position and co-variables (OR=1.80, 95% CI=1.58–2.04; OR=4.22, 95% CI=3.74–4.75, respectively).

Table 4 shows multiple logistic regression models for women. The overall association between occupational position and poor psychological health was significant in all models at a 0.05 level. In

**Table 3**

Logistic regression analysis on the association between occupation and poor psychological health (K6 9+) in men (N=7123).

	Model 1			Model 2 (Model 1+education+household income)			Model 3 (Model 2+job control)			Model 4 (Model 2+effort-reward imbalance)		
	OR	95% CI	$\chi^2$	OR	95% CI	$\chi^2$	OR	95% CI	$\chi^2$	OR	95% CI	$\chi^2$
<b>Occupation</b>												
Manual/service workers	1.00		3.7	1.00		4.6	1.00		16.0***	1.00		3.4
Clerical/associate prof.	1.14	0.99–1.32		1.17	1.00–1.37		1.33	1.14–1.56		1.16	0.99–1.37	
Professional/managerial	1.03	0.90–1.17		1.16	0.99–1.36		1.35	1.14–1.60		1.11	0.94–1.32	
<b>Education</b>												
Without higher degree				1.00		0.3	1.00		1.7	1.00		0.1
Higher degree				1.04	0.91–1.19		1.09	0.96–1.25		1.02	0.89–1.18	
<b>Household income</b>												
Low				1.00		29.6***	1.00		25.1***	1.00		23.9***
Middle				0.89	0.77–1.03		0.91	0.79–1.06		0.80	0.68–0.93	
High				0.62	0.52–0.75		0.65	0.54–0.78		0.62	0.51–0.75	
<b>Job control</b>												
Middle and high							1.00		79.3***			
Low							1.80	1.58–2.04				
<b>Effort-reward imbalance</b>												
Middle and low										1.00		562.4***
High										4.22	3.74–4.75	

All models were adjusted for age and working hours.

Chi-squared for likelihood ratio test for type three analysis. DF=2 for occupational position and household income, DF=1 for job control and effort-reward imbalance.

\*\*\*  $p < 0.001$ 

women, professionals/managers were significantly more likely than manual/service workers to report poor psychological health (Model 1: OR=1.70, 95% CI=1.31–2.19). This significant association remained after adjusted for household income and education (Model 2). As with men, women in professional/managerial occupations became more likely to have poor psychological health than women in manual/service occupations, once job control was taken into account (Model 3: OR=2.06, 95% CI=1.56–2.74). However, the higher likelihood of poor psychological health amongst professionals and managers compared with manual and service workers was attenuated when effort-reward imbalance was added to the model (Model 4). As with men, low job control and high effort-reward imbalance had a positive independent association with poor psychological health in women (OR=1.49, 95% CI=1.21–1.82; OR=3.65, 95% CI=2.98–4.46, respectively).

## 5. Discussion

This study found particularly high levels of poor psychological health amongst Japanese women in professional and managerial occupations. In our sample, women in professional/managerial occupations were 70% more likely to report poor psychological health than women in manual/service occupations. The Equal Employment Opportunity (EEO) Law in Japan protects women from unequal treatment at work based on their gender. Nevertheless, Japanese society still carries the legacy of male domination in managerial and some professional occupations (Benson et al., 2007; Ministry of Internal Affairs and Communications, 2013;

Webb, 2010). Sekine et al. (2009) found that a higher occupational grade was associated with better psychological health among male Japanese civil servants, but not among female counterparts. The authors suggested that the better psychological health of Japanese men in higher grade positions might be due to authoritative power which was not enjoyed by women in the same occupational position. Evidence suggests that those employed in more senior occupational positions experience greater job control and less effort-reward imbalance, which may be beneficial to their psychological health (Bonde, 2008; Stansfeld, 2002; Stansfeld, Fuhrer, Shipley, & Marmot, 1999); however, this may not be the case for women, especially in the Japanese context (Sekine et al., 2006). For example, job control has been found to be lower among women compared to men across occupational positions in Japan (Kawakami et al., 2004). In addition, a Japanese study found that women in senior positions experienced more effort-reward imbalance than women in other occupational positions, while the opposite was true for men (Kawaharada et al., 2007). In the male-dominated work environment, female workers may need to dedicate great effort in demonstrating the same level of commitment to the firms as that of male colleagues in an attempt to fulfil occupational roles and gendered social roles (Ogiwara et al., 2008). Despite their dedication to work, women still have fewer prospects for career advancement in contemporary Japanese society (Futagami, 2010). These conditions may have resulted in their perception that their work is less rewarding without being held in high esteem for their occupational achievement.

We found that women in manual/service work had lower effort-reward imbalance than women in professional/managerial

**Table 4**  
Logistic regression analysis on the association between occupation and poor psychological health (K6 9+) in women (N=2222).

	Model 1			Model 2 (Model 1 + education + household income)			Model 3 (Model 2 + job control)			Model 4 (Model 2 + effort–reward imbalance)		
	OR	95% CI	$\chi^2$	OR	95% CI	$\chi^2$	OR	95% CI	$\chi^2$	OR	95% CI	$\chi^2$
<b>Occupation</b>												
Manual/service workers	1.00		28.7***	1.00		28.7***	1.00		36.8***	1.00		9.0*
Clerical/associate prof.	0.99	0.77–1.27		1.03	0.80–1.33		1.11	0.86–1.45		0.91	0.70–1.19	
Professional/managerial	1.70	1.31–2.19		1.78	1.36–2.33		2.06	1.56–2.74		1.29	0.97–1.71	
<b>Education</b>												
Without higher degree				1.00		< 0.1	1.00		0.1	1.00		0.5
Higher degree				1.00	0.81–1.24		1.03	0.83–1.27		1.08	0.87–1.34	
<b>Household income</b>												
Low				1.00		7.2*	1.00		6.8*	1.00		6.8*
Middle				0.80	0.64–1.01		0.80	0.64–1.01		0.76	0.60–0.97	
High				0.73	0.56–0.94		0.73	0.57–0.95		0.76	0.58–0.99	
<b>Job control</b>												
Middle and high							1.00		14.6***			
Low							1.49	1.21–1.82				
<b>Effort–reward imbalance</b>												
Middle and low										1.00		157.5***
High										3.65	2.98–4.46	

All models were adjusted for age and working hours.

Chi-squared for likelihood ratio test for type three analysis. DF=2 for occupational position and household income, DF=1 for job control and effort–reward imbalance.

\*  $p < 0.05$ .

\*\*\*  $p < 0.001$ .

work. This may reflect less demonstrative effort and time commitment required in these occupations, allowing women in these positions greater flexibility in meeting domestic demands, combined with lower expectations regarding job rewards (Futagami, 2010). This does not imply high levels of job quality in these positions as previous work has shown that Japanese women with manual/service occupations experience greater job insecurity and worse career prospects than women with other occupations (Futagami, 2010).

Contrary to our hypothesis, we did not find an association between occupational position and psychological health in Japanese men. This finding contradicts a previous study showing that men in higher occupational grades had better psychological health than those in less advantaged occupational positions in Japan (Sekine et al., 2009). This may be due to differences in sample populations in these two studies (civil servants vs. employees from private firms). Ongoing economic recession since early 1900s in Japan may have impacted the working conditions of employees in private firms and in civil service differently. Compared to civil service, workers at private firms experienced greater job insecurity and wage restructuring, which did not exempt workers in senior positions (Casey, 2005). Bringing greater threat against one's occupational privilege, this condition may have caused greater stress on men in senior positions (Hiyoshi, Fukuda, Shipley, & Brunner, 2012).

In our study, an increased likelihood of poor psychological health amongst associate professional/clerical and professional/managerial groups emerged in both genders once job control was adjusted for, indicating that the relatively high levels of job-control (and to a lesser extent, household income) in these groups may be protecting those in professional and managerial occupations from potentially higher levels of psychological health.

We found strong, significant associations between psychosocial work characteristics and poor psychological health independent of household income in both men and women. The strength of the association was larger for effort–reward imbalance than in job control, which is consistent with previous findings (Calnan, Wadsworth, May, Smith, & Wainwright, 2004; de Jonge, Bosma, Peter, & Siegrist, 2000). We also found that the occupational patterning differed between our two indicators of psychosocial job characteristics – job control and effort–reward imbalance. Levels of job control increased with the increasing status of occupational positions in both genders. Conversely, effort–reward imbalance was highest for women in the highest status occupations and was not associated with occupational position for men. Furthermore, occupational position was not related to psychological health in an expected direction, while increasing income level was associated with better psychological health. These findings reinforce the notion that occupation can be a complex, multi-dimensional construct with psychosocial elements that do not always correspond with advantageous material or social circumstances (Siegrist et al., 2009, 2004).

Our findings need to be interpreted in the light of the following methodological limitations. First of all, we could not account for the effect of family status in this study because the information was not available to us. The association between occupational position and poor psychological health might have been overestimated, if female professionals/managers in our sample were less likely to be married than those in manual/service occupations as since marriage is known to have a positive association with psychological health (Inaba et al., 2005). In addition, our study is cross-sectional in design, and so unable to establish a temporal order between study factors. Further studies with a longitudinal design can allow us to further investigate the timing and

mechanisms between occupational position, psychosocial work characteristics, and psychological health.

## 6. Conclusion

Our study suggests that women in professional or managerial occupations in contemporary Japanese society are vulnerable to poor psychological health possibly due to high levels of effort–reward imbalance. Occupational positions that are largely dominated by male workers may expose women to greater psychosocial stressors in Japan. The idea that women's waged-labour is supplemental to that of men is still prevalent in contemporary Japan, especially among men (Cabinet Office, 2014). Ensuring gender equality in access to rewards may be a critical component for reducing gender inequality in psychological health among Japanese workers. Policies to improve the psychological health of the working population in Japan ought to address the unequal distribution of qualitative aspects of paid work between men and women and structural gender inequality in the labour market. Further examination on the association among occupation, work–family conflict, and effort–reward imbalance would encourage such policies by elucidating underlying mechanisms behind the occupational gradient in psychological health among Japanese women.

## Acknowledgement

We thank Professor Akizumi Tsutsumi, who directed the Japanese study of Health, Occupation and Psychosocial Factors Related Equity (J-HOPE), all members of J-HOPE team, and all participating workers in the J-HOPE.

The J-HOPE was funded by a Grant-in-Aid for Scientific Research on Innovative Areas (research in a Proposed Research Area) 2009–2013 (No. 4102-21119001) from the Ministry of Education, Culture, Sports, Science and Technology, Japan. MU was supported by the University College London Balzan Fellowship. AM was supported by a European Research Council Starting Grant (ERC-2011-StG\_20101124). NC was supported by the UK Economic and Social Research Council (ES/J019119).

## References

- Abe, Y. (2010). Equal employment opportunity law and the gender wage gap in Japan: A cohort analysis. *Journal of Asian Economics*, 21, 142–155. <http://dx.doi.org/10.1016/j.asieco.2009.12.003>.
- Benson, J., Yuasa, M., & Debroux, P. (2007). The prospect for gender diversity in Japanese employment. *International Journal of Human Resource Management*, 18, 890–907. <http://dx.doi.org/10.1080/09585190701249495>.
- Bonde, J. P. E. (2008). Psychosocial factors at work and risk of depression: A systematic review of the epidemiological evidence. *Occupational and Environmental Medicine*, 65, 438–445. <http://dx.doi.org/10.1136/oem.2007.038430>.
- Bosma, H., Marmot, M. G., Hemingway, H., Nicholson, A. C., Brunner, E., & Stansfeld, S. (1997). Low job control and risk of coronary heart disease in Whitehall II (prospective cohort) study. *British Medical Journal*, 314, 558–565.
- Brinton, M. C. (1993). *Women and the economic miracle: Gender and work in postwar Japan*. California: University of California Press.
- Cabinet Office (2015). *The fiscal 2014 whitepaper on gender equity 2014*. Tokyo: Government of Japan. Retrieved from: ([http://www.gender.go.jp/about\\_danjo/whitepaper/h26/zentai/index.html](http://www.gender.go.jp/about_danjo/whitepaper/h26/zentai/index.html)) (22.06.15).
- Calnan, M., Wadsworth, E., May, M., Smith, A., & Wainwright, D. (2004). Job strain, effort–reward imbalance, and stress at work: Competing or complementary models? *Scandinavian Journal of Public Health*, 32, 84–93. <http://dx.doi.org/10.1080/14034940310001668>.
- Campos-Serna, J., Ronda-Perez, E., Artazcoz, L., Moen, B., & Benavides, F. (2013). Gender inequalities in occupational health related to the unequal distribution of working and employment conditions: A systematic review. *International Journal for Equity in Health*, 12, 57.
- Casey, B. H. (2005). The employment of older people: Can we learn from Japan? *Geneva Paper*, 30, 620–637. <http://dx.doi.org/10.1057/palgrave.gpp.2510051>.
- Crompton, R. (2006). *Employment and the family*. Cambridge: Cambridge University Press.
- de Jonge, J., Bosma, H., Peter, R., & Siegrist, J. (2000). Job strain, effort–reward imbalance and employee well-being: A large-scale cross-sectional study. *Social Science & Medicine*, 50, 1317–1327. [http://dx.doi.org/10.1016/S0277-9536\(99\)00388-3](http://dx.doi.org/10.1016/S0277-9536(99)00388-3).
- Edwards, L. N. (1994). The status of women in Japan: Has the equal employment opportunity law made a difference? *Journal of Asian Economics*, 5, 217–240. [http://dx.doi.org/10.1016/1049-0078\(94\)90025-6](http://dx.doi.org/10.1016/1049-0078(94)90025-6).
- Feuvre, N. L. (2010). Feminising professions in Britain and France: How countries differ In: J. Scott, R. Crompton, & C. Lyonette (Eds.), *Gender inequalities in the 21st century: New barriers and continuing constraints* (pp. 126–149). Cheltenham: Edward Elgar.
- Furukawa, T. A., Kawakami, N., Saitoh, M., Ono, Y., Nakane, Y., Nakamura, Y., et al. (2008). The performance of the Japanese version of the K6 and K10 in the World Mental Health Survey Japan. *International Journal of Methods in Psychiatric Research*, 17, 152–158. <http://dx.doi.org/10.1002/mp.257>.
- Futagami, S. (2010). *Non-standard employment in Japan: Gender dimensions*. Geneva: International Institute for Labour Studies (Retrieved 22.06.15) [http://www.ilo.org/wcmsp5/groups/public/-dgreports/-inst/documents/publication/wcms\\_192841.pdf](http://www.ilo.org/wcmsp5/groups/public/-dgreports/-inst/documents/publication/wcms_192841.pdf).
- Hiyoshi, A., Fukuda, Y., Shipley, M. J., & Brunner, E. J. (2012). Health inequality in Japan: The role of material, psychosocial, social relational and behavioural factors. *Social Science & Medicine*, 104, 201–209. <http://dx.doi.org/10.1016/j.socscimed.2013.12.028>.
- Inaba, A., Thoits, P. A., Ueno, K., Gove, W. R., Evenson, R. J., & Sloan, M. (2005). Depression in the United States and Japan: Gender, marital status, and SES patterns. *Social Science & Medicine*, 61, 2280–2292. <http://dx.doi.org/10.1016/j.socscimed.2005.07.014>.
- International Labour Organization (2012). *International classification of occupations: ISCO-08*. Geneva: International Labour Office (Retrieved 22.06.15) [http://www.ilo.org/wcmsp5/groups/public/-dgreports/-dcomm/-publ/documents/publication/wcms\\_172572.pdf](http://www.ilo.org/wcmsp5/groups/public/-dgreports/-dcomm/-publ/documents/publication/wcms_172572.pdf).
- Karasek, R. (1985). *Job content questionnaire and user's guide*. Lowell: University of Massachusetts at Lowell.
- Kawaharada, M., Saijo, Y., Yoshioka, E., Sato, T., Sato, H., & Kishi, R. (2007). Relations of occupational stress to occupational class in Japanese civil servants: Analysis by two occupational stress models. *Industrial Health*, 45, 247–255.
- Kawakami, N., et al. (2004). Occupational class and exposure to job stressors among employed men and women in Japan. *Journal of Epidemiology*, 14, 204–211. <http://dx.doi.org/10.2188/jea.14.204>.
- Kawakami, N., & Fujigaki, Y. (1996). Reliability and validity of the Japanese version of job content questionnaire: Replication and extension in computer company employees. *Industrial Health*, 34, 295–306.
- Kawakami, N., Kobayashi, F., Araki, S., Haratani, T., & Furui, H. (1995). Assessment of job stress dimensions based on the job demands – control model of employees of telecommunication and electric power companies in Japan: Reliability and validity of the Japanese version of the Job Content Questionnaire. *International Journal of Behavioural Medicine*, 2, 358–375. [http://dx.doi.org/10.1207/s15327558ijbm0204\\_5](http://dx.doi.org/10.1207/s15327558ijbm0204_5).
- Kessler, R. C., et al. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine*, 32, 959–976.
- Kumamoto-Healey, J. (2005). Women in the Japanese labour market, 1947–2003: A brief survey. *International Labour Review*, 144, 451–472. <http://dx.doi.org/10.1111/j.1564-913X.2005.tb00577.x>.
- Kurioka, S., Inoue, A., & Tsutsumi, A. (2014). Optimum cut-off point of the Japanese short version of the effort–reward imbalance questionnaire. *Journal of Occupational Health*, 55, 340–348.
- Ministry of Health, Labour and Welfare (2011). *The first meeting for the study of part-time labor policy: Appendix 1*. Tokyo: Government of Japan (Retrieved 20.08.15) <http://www.mhlw.go.jp/stf/shingi/2r98520000011q6m-att/2r98520000011wj1.pdf>.
- Ministry of Internal Affairs and Communications (2013). *Employment status survey 2012*. Tokyo: Government of Japan (Retrieved 22.06.15) <http://www.stat.go.jp/english/data/shugyou/pdf/sum2012.pdf>.
- Nakata, Y., & Takehiro, R. (2002). Employment and wages of female Japanese workers: Past, present, and future. *Industrial Relations*, 41, 521–547.
- Ogiwara, C., Tsuda, H., Akiyama, T., & Sakai, Y. (2008). Gender-related stress among Japanese working women. *Transcultural Psychiatry*, 45, 470–488.
- Palència, L., et al. (2014). The influence of gender equality policies on gender inequalities in health in Europe. *Social Science & Medicine*, 117, 25–33. <http://dx.doi.org/10.1016/j.socscimed.2014.07.018>.
- Rose, D., & Pevalin, D. J. (2005). *The National Statistics Socio-economic Classification: Origins, development and use*. New York: Palgrave Macmillan Retrieved from: ([file://ad.ucl.ac.uk/slms/home2/rmjlmum/Downloads/nssecorigin\\_tcm77-231573.pdf](file://ad.ucl.ac.uk/slms/home2/rmjlmum/Downloads/nssecorigin_tcm77-231573.pdf)) (22.06.15).
- Seedat, S., et al. (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. <http://dx.doi.org/10.1001/archgenpsychiatry.2009.36>.
- Sekine, M., Chandola, T., Martikainen, P., Marmot, M., & Kagamimori, S. (2006). Socioeconomic inequalities in physical and mental functioning of Japanese civil servants: Explanations from work and family characteristics. *Social Science & Medicine*, 63, 430–445. <http://dx.doi.org/10.1016/j.socscimed.2006.01.020>.

- Sekine, M., Chandola, T., Martikainen, P., Marmot, M., & Kagamimori, S. (2009). Socioeconomic inequalities in physical and mental functioning of British, Finnish, and Japanese civil servants: Role of job demand, control, and work hours. *Social Science & Medicine*, 69, 1417–1425. <http://dx.doi.org/10.1016/j.socscimed.2009.08.022>.
- Shire, K. A. (2008). Gender dimensions of the ageing workforce In: F. Coulmas, H. Conrad, A. Schad-Seifert, & G. Vogt (Eds.), *The demographic change: A handbook about Japan* (pp. 963–978). Leiden: Brill.
- Siegrist, J., et al. (2004). The measurement of effort-reward imbalance at work: European comparisons. *Social Science & Medicine*, 58, 1483–1499. [http://dx.doi.org/10.1016/s0277-9536\(03\)00351-4](http://dx.doi.org/10.1016/s0277-9536(03)00351-4).
- Siegrist, J., Wege, N., Pühlhofer, F., & Wahrendorf, M. (2009). A short generic measure of work stress in the era of globalization: Effort–reward imbalance. *International Archives of Occupation and Environmental Health*, 82, 1005–1013. <http://dx.doi.org/10.1007/s00420-008-0384-3>.
- Stansfeld, S. (2002). Work, personality and mental health. *British Journal of Psychiatry*, 181, 96–98. <http://dx.doi.org/10.1192/bjp.181.2.96>.
- Stansfeld, S. A., Fuhrer, R., Shipley, M. J., & Marmot, M. G. (1999). Work characteristics predict psychiatric disorder: Prospective results from the Whitehall II Study. *Occupation and Environmental Medicine*, 56, 302–307. <http://dx.doi.org/10.1136/oem.56.5.302>.
- Tsutsumi, A., Ishitake, T., Peter, R., Siegrist, J., & Matoba, T. (2001). The Japanese version of the Effort-Reward Imbalance Questionnaire: A study in dental technicians. *Work & Stress*, 15, 86–96. <http://dx.doi.org/10.1080/02678370118173>.
- Tsutsumi, A. (2013). Japanese study of Health, Occupation and Psychosocial factors related Equity (J-HOPE): Outline and products. In *Proceedings of the international conference on social stratification and health 2013: Interdisciplinary research and action for equity symposium*. 31 August. Retrieved from: ([http://mental.m.u-tokyo.ac.jp/sdh/pdf/Symposium%201\\_2013.pdf](http://mental.m.u-tokyo.ac.jp/sdh/pdf/Symposium%201_2013.pdf)).
- Webb, J. (2010). Gender and the post-industrial shift In: J. Scott, R. Crompton, & C. Lyonette (Eds.), *Gender inequalities in the 21st century: New barriers and continuing constraints* (pp. 85–108). Cheltenham: Edward Elgar.