

# Association between working hours, work engagement, and work productivity in employees: A cross-sectional study of the Japanese Study of Health, Occupation, and Psychosocial Factors Relates Equity

Emi Okazaki<sup>1</sup>  | Daisuke Nishi<sup>1,2</sup>  | Ryoko Susukida<sup>1,3</sup>  | Akiomi Inoue<sup>4</sup>  |  
Akihito Shimazu<sup>5</sup>  | Akizumi Tsutsumi<sup>4</sup> 

<sup>1</sup>Department of Mental Health Policy, National Institute of Mental Health, National Center of Neurology and Psychiatry, Kodaira, Japan

<sup>2</sup>Department of Mental Health, Graduate School of Medicine, The University of Tokyo, Tokyo, Japan

<sup>3</sup>Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland

<sup>4</sup>Department of Public Health, Kitasato University School of Medicine, Sagamihara, Japan

<sup>5</sup>Center for Human and Social Sciences, College of Liberal Arts and Sciences, Kitasato University, Sagamihara, Japan

## Correspondence

Daisuke Nishi, Department of Mental Health, Graduate School of Medicine, The University of Tokyo, Tokyo, Japan.  
Email: d-nishi@umin.ac.jp

## Funding information

The present study was supported 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, a KAKENHI Grant Number 26253042 from the Japan Society for the Promotion of Science, and 2016-2018 (H27-Rodo-Anzen-Eisei-Sogo) from the Ministry of Health, Labour and Welfare, Japan.

## Abstract

**Objectives:** The aims of the study were to investigate the association between working hours, work engagement, and work productivity, and to examine if work engagement moderates the influence of working hours on work productivity.

**Methods:** We used cross-sectional data from the Japanese occupational cohort survey, which involved 2093 employees in a manufacturing industry. Working hours were self-reported by the study participants. Work productivity was assessed with absolute presenteeism based on the scale of the validated Japanese version of World Health Organization Health and Work Performance Questionnaire (WHO-HPQ). Work engagement was assessed with the Nine-item Utrecht work Engagement Scale (UWES-9). Univariate and multivariable regression analyses were conducted to examine the association of working hours and work engagement with work productivity. We also carried out stratified multivariable regression analysis separately for those with high-work engagement and those with low-work engagement.

**Results:** Working >40 to 50 hours per week and >50 hours per week were significantly positively associated with work productivity in univariate analysis. However, the significant association no longer held after adjusting for work engagement. Work engagement was positively associated with work productivity even after controlling for potential confounders. Working hours were not significantly associated with work productivity among those with high-work engagement or among those with low-work engagement.

**Conclusions:** Working hours did not have any significant associations with work productivity when taking work engagement into account. Work engagement did not moderate the influence of working hours on work productivity, though it attenuated the relationship between working hours and work productivity.

## KEYWORDS

work engagement, work productivity, working hours

## 1 | INTRODUCTION

Work productivity has been increasingly gaining attention as one of the key social measures in Japan especially because Japan is experiencing rapid aging of its society and shortage of labor force.<sup>1</sup> The improvement in work productivity has become one of the most important goals for sustainable economic growth. As a result, there is a growing interest on what determines work productivity and how to improve it.

Working hours have been investigated as one of the predictive factors of work productivity. There are some positive aspects of long working hours on work productivity. One study using British war plant data suggested that longer working hours increased work productivity though output decreased as working hours increase above a threshold.<sup>2</sup> Another research with the data of medical-surgical nurse has reported that the positive correlation between working hours and work engagement,<sup>3</sup> positive mind of states for work, which leads to higher work productivity. On the other hand, some studies have suggested that excessively high-level of commitment in workplace can have a negative impact on work productivity. Previous study using the data of workers in manufacturing industry, for example, have suggested that long working hours do not always improve work productivity.<sup>4</sup> Another study using longitudinal Japanese firm data has shown that working more than 50 hours per week degrade the state of mental health<sup>5</sup> and has also found a dose-response relationship between working hours and incident cardiovascular disease.<sup>6</sup> Additionally, a meta-analysis has reported the positive correlation between working hours and both physiological and psychological health symptoms.<sup>7</sup> These health symptoms in workplace could lead to lower work productivity, absenteeism, and presenteeism.<sup>8</sup> Given these findings, long working hours might reduce work productivity through deterioration of health condition. However, another meta-analysis has reported that the working 50 or more hours per week was not significantly associated with the onset of depressive disorder.<sup>9</sup> Therefore, it is not entirely clear how working hours and work productivity are interrelated to each other.<sup>4</sup> As described above, while the concept of work productivity has been used widely and the definition is full of variety, most review articles have been defined work productivity as “absenteeism” and “presenteeism.”<sup>10,11</sup> Absenteeism refers to the missed time of work because of illness. “Presenteeism” refers to the reduction in work performance due to illness in employees while at work.<sup>12</sup>

In recent literature, work engagement has been attracting attention as a key factor in improving work productivity.<sup>13</sup> Work engagement is defined as “positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption.”<sup>14</sup> Previous studies have shown that work engagement is predictive of work performance.<sup>15-18</sup> Highly engaged employees tend to perform well<sup>15,16</sup> and contribute to sales.<sup>17</sup> Another research using data of workers in the Netherlands has shown that highly engaged workers reported fewer errors compared to workers with burnout.<sup>18</sup>

Given these findings on the relationship between working hours, work engagement, and work productivity, work engagement may moderate the influence of working hours on work productivity. Long working hours may increase work productivity among those who have higher-work engagement, while it may decrease work productivity among those who have lower-work engagement. The purpose of this study was to investigate the association of work productivity with working hours and work engagement. This study also examined if work engagement moderate the influence of working hours on work productivity.

## 2 | MATERIALS AND METHODS

### 2.1 | Participants

Our data are drawn from the four survey waves of an occupational cohort study on social and health in Japan (Japanese Study of Health, Occupation, and Psychosocial Factors Relates Equity; J-HOPE). The first wave was conducted between October 2010 and December 2011, and the following waves were conducted just about 1 year after the previous ones. Data were collected from annual health checkups, which were required for all Japanese employees. The recruitment differed across study sites; the health checkups were carried out in a fixed month every year. The study population consisted of employees working for 13 companies in 12 industries and a wide variety of occupations.

We used a cross-sectional data set from the third wave which included three main variables of this study, working hours, work engagement, and work productivity. We analyzed the data of 2093 participants (participation rates: 79.0%) after excluding the missing data (N = 101, 4.6% out of 2194 correspondents). These participants were workers in a manufacturing company since the questionnaire about work productivity was geared exclusively to this industry. Job categories were manager, professional (eg, researcher, computer engineer), technologist (eg, electrician, nutritionist), office job, service, productive technologist to need technic (eg, architect, mechanic), productive technologist to operate machine (eg, running of machine), productive technologist with using body (eg, packaging, cleaning) and the others.

### 2.2 | Measures

#### 2.2.1 | Working hours

Working hours were measured by the following question: “How long do you work on average in a week (including overtime hours)?” The survey asked respondents to choose from five working hour brackets (<30, 31 to 40, 41 to 50, 51 to 60, and >60 hours per week). Working hours were classified into 3 groups (31 to 40

hours per week, >40 to 50 hours per week, and more than 51 hours per week) based on a previous study<sup>19</sup> after omitting <30 hours per week bracket to exclude part-time job worker in the study.

### 2.2.2 | Health and work performance questionnaire

World Health Organization Health and Work Performance Questionnaire (WHO-HPQ) is a self-report questionnaire for measuring job performance.<sup>20</sup> We used the validated Japanese version of the WHO-HPQ short form.<sup>21</sup> WHO-HPQ consists of two aspects: absolute presenteeism and relative presenteeism. Absolute presenteeism is actual performance; and relative presenteeism is a ratio of actual performance to the performance of most workers at the same job.<sup>22</sup> In this study, we used absolute presenteeism as a measure of work productivity. Absolute presenteeism is measured by the following question: “On a scale from 0 to 10, where 0 is the worst job performance anyone could have at your job and 10 is the performance of a top worker, how would you rate your overall job performance on the days you worked during the past four weeks?”<sup>22</sup> The absolute presenteeism score is calculated by multiplying the respondent's answer to the question by 10. The absolute presenteeism score range from 0 (total lack of performance during working hours) to 100 (no lack of performance during working hours). Low-presenteeism score indicates poor job performance.

### 2.2.3 | Nine-item Japanese version of the Utrecht Work Engagement Scale

Nine-item Utrecht work Engagement Scale (UWES-9) is a self-report questionnaire for measuring work engagement.<sup>23</sup> It consists of three subscales; vigor (eg, “At my work, I feel bursting with energy”), dedication (“I am enthusiastic about my job”), and absorption (“I feel happy when I am working intensely”). Each subscale consists of three items which were rated on a 7-point Likert scale ranging from 0 (“never”) to 6 (“always”). Overall score for the UWES-9 was the sum of these three subscales. The validity and reliability of the Japanese versions of UWES-9 are confirmed.<sup>24</sup>

### 2.2.4 | Demographic characteristics

The following variables were included in the analyses as potential confounders: age (continuous variable), gender (men vs women), and educational attainment (high school or below, junior college, college, graduate school).

## 2.3 | Statistical analysis

We conducted statistical analysis with complete cases. Univariate and multivariable regression analyses were conducted to examine the association of working hours and

work engagement with work productivity. The first model estimated a crude coefficient with univariate regression analysis. Next, we estimated multiple regression model using work productivity as a dependent variable and working hours as an independent variable while controlling for demographic characteristics (age, gender, and educational level). The third model added work engagement to model 2.

Furthermore, in order to assess if work engagement moderate the influence of working hours on work productivity, we carried out stratified multivariable regression analysis separately for those with high-work engagement and those with low-work engagement (divided into high and low based on median). This analysis was adjusted for demographic characteristics (age, gender, and educational level). Data were analyzed using IBM SPSS Statistics version 23.0 for windows (IBM Japan, Tokyo, Japan).

## 3 | RESULTS

The characteristics of the study participants are presented in Table 1. Approximately half of the participants were working >40 to 50 hours per week. The proportion of those who were working 31 to 40 hours per week with low-work engagement was higher than those same working hours with high-work engagement. The proportion of those who were working more than 50 hours per week with high-work engagement was higher than those same working hours with low-work engagement.

Table 2 shows the results of univariate and multivariable regression analysis. Univariate regression analysis showed that working >40 to 50 hours per week and >50 hours per week were significantly positively associated with work productivity. Multivariable regression analysis showed that work engagement was positively associated with work productivity after adjusting for demographic characteristics, whereas working hours were not significantly associated with work productivity.

Table 3 presents the results of stratified multivariable regression analysis which assessed if work engagement moderates the influence of working hours on work productivity. Working hours were not significantly associated with work productivity among those with both high-work engagement and low-work engagement.

## 4 | DISCUSSION

We found that working hours did not have any significant associations with work productivity after adjusting for work engagement. This finding is inconsistent with the previous study using manufacturing company data, which found that work productivity was proportional to working hours.<sup>2</sup> It is likely that work engagement has direct association with work

**TABLE 1** Characteristics of participants (N = 2093)

Variables	n	%	Mean (range)	Median (range)	SD
Age			43.6 (20-65)		9.8
Gender, men	1860	88.9			
Education					
Graduate school	331	15.8			
College	894	42.8			
Junior college	190	9.1			
High school or below	678	32.4			
Working hours					
Working 31 to 40 hours/week	422	20.2			
Working >40 to 50 hours/week	1103	52.7			
Working more than 50 hours/week	568	27.1			
Working hours and work engagement					
Working 31 to 40 hours/week with low-work engagement	267	12.8			
Working 31 to 40 hours/week with high-work engagement	155	7.4			
Working >40 to 50 hours/week with low-work engagement	510	24.3			
Working >40 to 50 hours/week with high-work engagement	593	28.3			
Working more than 50 hours/week with low-work engagement	227	10.9			
Working more than 50 hours/week with high-work engagement	341	16.3			
Work engagement			2.9 (0-6)		1.0
Low	1004	48.0			
High	1089	52.0			
Occupation					
Managers	525	25.1			
Not managers	1568	74.9			
Work productivity			57.4 (0-100)		18.4

productivity, and working hours may be a proxy of the level of work engagement.

The present study demonstrated that the influence of working hours on work productivity was not moderated by work engagement. That is, our hypothesis was not supported. This insignificant finding might be due to the type II error. Since the lower confidence limit was almost 0, the relationship might be significant if the sample size was much larger. In addition, our results suggested that work engagement attenuated the relationship between working hours and work productivity. Therefore, a further study would be required to verify the relationship between working hours, work engagement, and work productivity.

While the causal relationship between work engagement and work productivity was not examined in our study, our findings suggested that not the length of working hours but the level of work engagement might be an important factor in improving work productivity. Similar findings were demonstrated that not working hours but work condition, such as high job satisfaction, high job control, was important to improve psychological health in occupational field.<sup>19,25</sup> On the other hand, some studies have suggested that excessively high engagement

would not be recommended. The previous studies have shown that exceedingly high levels of work engagement could increase the level of C-reactive protein<sup>26</sup> and the risk of onset of major depressive episode.<sup>27</sup> It has been also reported that excessively high engagement to the workplace is associated with work-to-home conflict.<sup>28</sup> Therefore, excessively high engagement may not be necessarily always beneficial for increasing work productivity. Moderately high engagement would improve work productivity; however, further examination is necessary to determine optimal level of work engagement.

There are some limitations to be considered in this study. First, since this study was a cross-sectional design, we could not investigate causal relationships between work productivity, working hours, and work engagement. Second, this study focused only on the samples of workers in manufacturing industry in Japan. Thus, the findings of this study may have limited generalizability to different industries. Third, response bias may have existed if non-respondents were systematically different from respondents. Particularly, the results of these findings would have been most biased if people with excessively long working hours

**TABLE 2** Results of univariate and multivariate regression analysis: relationships between working hours and work engagement with work productivity

Variables	Univariate		Multivariate			
	Model 1 <sup>a</sup>		Model 2 <sup>b</sup>		Model 3 <sup>c</sup>	
	Unstandardized beta (95% CI)	Standardized beta	Unstandardized beta (95% CI)	Standardized beta	Unstandardized beta (95% CI)	Standardized beta
Working hours per week:						
31 to 40	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
> 40 to 50	2.63 (0.56 to 4.69) <sup>d</sup>	0.07 (0.02 to 0.13) <sup>d</sup>	2.78 (0.67 to 4.88) <sup>e</sup>	0.08 (0.02 to 0.13) <sup>e</sup>	0.49 (−1.41 to 2.39)	0.01 (−0.04 to 0.07)
> 50	4.60 (2.28 to 6.92) <sup>f</sup>	0.11 (0.06 to 0.17) <sup>f</sup>	4.38 (1.82 to 6.93) <sup>f</sup>	0.11 (0.04 to 0.17) <sup>f</sup>	2.05 (−0.24 to 4.35)	0.05 (−0.01 to 0.11)
Work engagement	8.80 (8.08 to 9.53) <sup>f</sup>	0.46 (0.42 to 0.50) <sup>f</sup>	-	-	8.62 (7.88 to 9.36) <sup>f</sup>	0.45 (0.41 to 0.49) <sup>f</sup>
Age	0.26 (0.18 to 0.34) <sup>f</sup>	0.14 (0.10 to 0.18) <sup>f</sup>	0.37 (0.28 to 0.45) <sup>f</sup>	0.19 (0.15 to 0.24) <sup>f</sup>	0.27 (0.19 to 0.35) <sup>f</sup>	0.14 (0.10 to 0.18) <sup>f</sup>
Gender	−1.85 (−4.36 to 0.67)	−0.03 (−0.07 to 0.01)	0.66 (−1.88 to 3.20)	0.01 (−0.03 to 0.06)	1.90 (−0.38 to 4.17)	0.03 (−0.01 to 0.07)
Educational level	1.12 (0.40 to 1.83) <sup>e</sup>	0.07 (0.02 to 0.11) <sup>e</sup>	1.76 (0.93 to 2.59) <sup>f</sup>	0.11 (0.06 to 0.15) <sup>f</sup>	0.28 (−0.47 to 1.03)	0.02 (−0.03 to 0.06)

Work engagement: Nine-item Utrecht work Engagement Scale.

Work productivity: World Health Organization Health and Work Performance Questionnaire.

<sup>a</sup>Unadjusted.<sup>b</sup>Adjusted for age, gender, educational level.<sup>c</sup>Added Work engagement to Model 1 and adjusted for age, gender, educational level.<sup>d</sup> $P < 0.05$ .<sup>e</sup> $P < 0.01$ .<sup>f</sup> $P < 0.001$ .

**TABLE 3** Results of stratified multivariate regression analysis of work productivity: relationships between working hours and work productivity depends on the level of work engagement

Variables	High-work engagement <sup>a</sup>		Low-work engagement <sup>b</sup>	
	Unstandardized beta (95% CI) <sup>c</sup>	Standardized beta	Unstandardized beta (95% CI) <sup>c</sup>	Standardized beta
Working hours per week				
31 to 40	Ref.	Ref.	Ref.	Ref.
>40 to 50	0.60 (−2.28 to 3.48)	0.02 (−0.06 to 0.09)	1.97 (−0.82 to 4.76)	0.05 (−0.02 to 0.13)
>50	2.67 (−0.61 to 5.95)	0.08 (−0.02 to 0.14)	2.86 (−0.78 to 6.49)	0.07 (−0.02 to 0.16)

CI, confidence interval.

Work engagement: Nine-item Utrecht work Engagement Scale.

Work productivity: World Health Organization Health and Work Performance Questionnaire.

<sup>a</sup>Above the median of UWES-9.

<sup>b</sup>Below the median of UWES-9.

<sup>c</sup>Adjusted for age, gender, and educational level.

have been systematically the non-respondents. Fourth, our results may be more generalizable for men since the number of female respondents was relatively small. Future research should explore if the findings of this study can be replicated with the data with more female workers. Fifth, since we examined working hours using self-reported instrument, we could not calculate working hours objectively. Hence, future study should consider how to collect them in detail. Sixth, collecting working hours data as a continuous variable which might be more clarify whether work engagement is moderator in statistical analysis in the future. Seventh, we could not control the type of employment, regular employees or part-time job workers, which might be confounded across the key variables since we did not collect the data. Finally, absolute presenteeism was the only measure available as a proxy of work productivity.<sup>20</sup> Future studies should consider another measure of work productivity, though absolute presenteeism can evaluate respondent's work performance from worst to superior.

In conclusion, working hours did not have any significant associations with work productivity when taking work engagement into account. Work engagement did not moderate the influence of working hour on work productivity, though it attenuated the relationship between working hours and work productivity. Future studies should investigate the mechanisms through which working hours and work engagement inter-relate to impact work productivity.

## ETHICAL APPROVAL

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

## CONFLICT OF INTEREST

The authors declare that they have no competing interests regarding this paper.

## DISCLOSURES

*Approval of the research protocol:* The Research Ethics Committee of the Graduate School of Medicine and Faculty of Medicine, The University of Tokyo (No. 2772), Kitasato University Medical Ethics Organization (No. B-12-103), and Ethics Committee of Medical Research, University of Occupational and Environmental Health, Japan (No. 10-004), reviewed and approved the aims and procedures of this study. *Informed consent:* Informed consent was obtained from all individual participants included in the study. *Registry and the registration no. of the study/trial:* N/A. *Animal studies:* N/A.

## ORCID

Emi Okazaki  <https://orcid.org/0000-0002-1720-4048>

Daisuke Nishi  <https://orcid.org/0000-0001-9349-3294>

Ryoko Susukida  <https://orcid.org/0000-0003-0444-5368>

Akiomi Inoue  <https://orcid.org/0000-0002-4079-0719>

Akihito Shimazu  <https://orcid.org/0000-0002-7172-0043>

Akizumi Tsutsumi  <https://orcid.org/0000-0003-0966-4869>

## REFERENCES

1. Ministry of Internal Affairs and Communications. Elderly people (over 65 years old) from the perspective of statistics in Japan. -Respecting for "the Aged Day"- Statistics Bureau, Ministry of Internal Affairs and Communications. [Online]. 2016 [cited 2017 Jul 7]; Available from <http://www.stat.go.jp/data/topics/topi971.htm> (in Japanese).

2. Pencavel J. The productivity of working hours. *Econ J*. 2015;125(589):2052-2076.
3. Simpson MR. Predictors of work engagement among medical-surgical registered nurses. *West J Nurs Res*. 2009;31(1):44-65.
4. Shepard E, Clifton T. Are longer hours reducing productivity in manufacturing? *Int J Manpow*. 2000;21(7):540-553.
5. Kuroda S, Yamamoto I. Does Mental Health Matter for Firm Performance? Evidence from longitudinal Japanese firm data. RIETI Discussion Paper, No16-E-016, Research Institute of Economy, Trade and Industry. 2016.
6. Conway SH, Pompeii LA, Roberts RE, et al. Dose-response relation between work hours and cardiovascular disease risk: findings from the panel study of income dynamics. *J Occup Environ Med*. 2016;58(3):221-226.
7. Sparks K, Cooper C, Fried Y, et al. The effects of hours of work on health: A meta-analytic review. *J Occup Organ Psychol*. 1997;70(4):391-408.
8. Suzuki T, Miyaki K, Song Y, et al. Relationship between sickness presenteeism (WHO-HPQ) with depression and sickness absence due to mental disease in a cohort of Japanese workers. *J Affect Disord*. 2015;180:14-20.
9. Watanabe K, Imamura K, Kawakami N. Working hours and the onset of depressive disorder: a systematic review and meta-analysis. *Occup Environ Med*. 2016;73(12):877-884.
10. Vandenplas O, Vinnikov D, Blanc PD, et al. Impact of rhinitis on work productivity: a systematic review. *J Allergy Clin Immunol Pract*. 2017.
11. Agaliotis M, Mackey MG, Jan S, et al. Burden of reduced work productivity among people with chronic knee pain: a systematic review. *Occup Environ Med*. 2014;71(9):651-659.
12. Kessler RC, Ames M, Hymel PA, et al. Using the World Health Organization Health and Work Performance Questionnaire (HPQ) to evaluate the indirect workplace costs of illness. *J Occup Environ Med*. 2004;46(Supplement):S23-S37.
13. Burton WN, Chen CY, Li X, et al. The association of employee engagement at work with health risks and presenteeism. *J Occup Environ Med*. 2017. 59:988-992.
14. Schaufeli WB, Salanova M, González-romá V, et al. The measurement of engagement and burnout: a two sample confirmatory factor analytic approach. *J Happiness Stud*. 2002;3(1):71-92.
15. Bakker AB, Demerouti E, Verbeke W. Using the job demands-resources model to predict burnout and performance. *Hum Resour Manage*. 2004;43(1):83-104.
16. Schaufeli WB, Taris TW, Bakker AB. Dr. Jekyll and Mr. Hyde? On the differences between work engagement and workaholism. In: Burke RJ, ed. *Research companion to working time and work addiction*. Northampton: Edward Elgar; 2006:193-217.
17. Xanthopoulou D, Bakker AB, Demerouti E, et al. Work engagement and financial returns: a diary study on the role of job and personal resources. *J Occup Organ Psychol*. 2009;82(1):183-200.
18. Prins JT, van der Heijden FM, Hoekstra-Weebers JE, et al. Burnout, engagement and resident physicians' self-reported errors. *Psychol Health Med*. 2009;14(6):654-666.
19. Long NA. working hours, job satisfaction, and depressive symptoms: a community-based cross-sectional study among Japanese employees in small- and medium-scale businesses. *Oncotarget*. 2017.
20. Kessler RC, Barber C, Beck A, et al. The World Health Organization Health and Work Performance Questionnaire (HPQ). *J Occup Environ Med*. 2003;45(2):156-174.
21. Suzuki T, Miyaki K, Sasaki Y, et al. Optimal cutoff values of WHO-HPQ presenteeism scores by ROC analysis for preventing mental sickness absence in Japanese prospective cohort. *PLoS ONE*. 2014;9(10):e111191.
22. Kessler R, Petukhova M, McInnes K. World Health Organization Health and Work Performance Questionnaire (HPQ). HPQ Short Form (Absenteeism and Presenteeism Questions and Scoring Rules). Harvard Medical School. [Online].2007 [cited 2017 Aug 2]; Available from: URL: <http://www.hcp.med.harvard.edu/hpq/ftpd/absenteeism%20presenteeism%20scoring%20050107.pdf>.
23. Schaufeli WB, Bakker AB, Salanova M. The measurement of work engagement with a short questionnaire. *Educ Psychol Meas*. 2006;66(4):701-716.
24. Shimazu A, Schaufeli WB, Kosugi S, et al. Work engagement in Japan: validation of the Japanese version of the Utrecht work engagement scale. *Appl Psychol*. 2008;57(3):510-523.
25. Hino A, Inoue A, Kawakami N, et al. Buffering effects of job resources on the association of overtime work hours with psychological distress in Japanese white-collar workers. *Int Arch Occup Environ Health*. 2015;88(5):631-640.
26. Eguchi H, Shimazu A, Kawakami N, et al. Work engagement and high-sensitivity C-reactive protein levels among Japanese workers: a 1-year prospective cohort study. *Int Arch Occup Environ Health*. 2015;88(6):651-658.
27. Imamura K, Kawakami N, Inoue A, et al. Work Engagement as a Predictor of Onset of Major Depressive Episode (MDE) among workers, independent of psychological distress: a 3-year prospective cohort study. *PLoS ONE*. 2016;11(2):e0148157.
28. Halbesleben JR, Harvey J, Bolino MC. Too engaged? A conservation of resources view of the relationship between work engagement and work interference with family. *J Appl Psychol*. 2009;94(6):1452-1465.

**How to cite this article:** Okazaki E, Nishi D, Susukida R, Inoue A, Shimazu A, Tsutsumi A. Association between working hours, work engagement, and work productivity in employees: A cross-sectional study of the Japanese Study of Health, Occupation, and Psychosocial Factors Relates Equity. *J Occup Health*. 2019;61:182-188. <https://doi.org/10.1002/1348-9585.12023>