

Supplementary Information

Table S1. Job stress check questionnaire

Category	Workplace indicator		Question
Burden	Workload (quantity)	Q1	I have to do an extremely large amount of work.
		Q2	I cannot finish my work in time.
		Q3	I have to work very hard.
	Workload (quality)	Q4	My job requires a lot of concentration.
		Q5	My job requires a high level of knowledge and skills.
		Q6	During work hours I need to always focus on my job.
	Physical burden	Q7	My job requires high physical burden.
	Interpersonal relationship at work	Q12	There are differences in opinion within my team.
		Q13	My team does not get along well with other teams.
		Q14	There is a friendly atmosphere at my workplace.
	Work environment	Q15	My work environment is poor in terms of noise, lighting, temperature, and ventilation.
	Emotional burden	Q58	My work is emotionally loaded.
	Role conflict	Q59	I receive conflicting demands from two or more people.
	Work-life balance (negative)	Q75	I cannot enrich my personal life since I am preoccupied with my work.
Task	Job control	Q8	I can work at my own pace.
		Q9	I can decide on how and in what order to do my job.
		Q10	My opinion is reflected in how the job gets done at my workplace.
	Job match	Q16	I feel that my job suits me.
	Skill utilization	Q11	My knowledge and skills are underutilized at work.
	Job meaning	Q17	I find my work to be meaningful.
	Role clarifies	Q60	I understand my duties and responsibilities.
	Opportunity for growth	Q61	I have opportunities to enhance my strength at work.
Group		Q47-48-49	How comfortable are you to talk to these people?
		Q50-51-52	How accountable are these people when you ask for help?
		Q53-54-55	How much do these people listen to you when you confide your personal problems?
	Support from manager	Q47	Manager(s)
		Q50	Manager(s)
		Q53	Manager(s)
	Support from coworkers	Q48	Coworker(s)
		Q51	Coworker(s)
		Q54	Coworker(s)

	Support from families	Q49	Spouse, family members, and friends
		Q52	Spouse, family members, and friends
		Q55	Spouse, family members, and friends
	Rewards (monetary, status)	Q62	My salary and bonus match my work.
	Rewards (respect)	Q63	My evaluation from my superior is reasonable.
	Job stability	Q64	I feel that there is a possibility to lose my job.
	Manager's leadership	Q65	My manager gives me opportunities to enhance my capabilities.
	Manager's fairness	Q66	My manager treats me with a sincere attitude.
	Workplace with encourages praising	Q67	Efforts made are rewarded at my workplace.
	Workplace where mistakes are recoverable	Q68	My workplace gives second chances to recover from mistakes made.
Worksite	Trust in management	Q69	Information from management is trustworthy.
	Adaptability to change	Q70	Employees' opinions are sought after at times of change in the job or workplace.
	Respect for individuals	Q71	Each employees' values are respected.
	Fairness in evaluation	Q72	Employee evaluation results are fully explained.
	Approach on diversity	Q73	Workers are respected regardless of their labor contracts/ forms of employment (i.e., Full-time employees, contracted employees, part-timers, etc.)
	Career development	Q74	Motivation-building or career-enhancing education is conducted at my workplace.
	Work-life balance (positive)	Q76	My life is enriched from being energized at work.
Category	Employee well-beings		Questions
Mental health	Vigor	Q18	I have been very active.
		Q19	I have been full of energy.
		Q20	I have been lively.
	Irritability	Q21	I have felt angry.
		Q22	I have been inwardly annoyed or aggravated.
		Q23	I have felt irritable.
	Fatigue	Q24	I have felt extremely tired.
		Q25	I have felt exhausted.
		Q26	I have felt weary or listless .
	Anxiety	Q27	I have felt tense.
		Q28	I have felt worried or insecure.
		Q29	I have felt restless.

Depressed mood	Q30	I have been depressed.
	Q31	I have thought that doing anything was a hassle.
	Q32	I have been unable to concentrate.
	Q33	I have felt gloomy.
	Q34	I cannot concentrate on my job.
	Q35	I have felt sad.
Physical health	Q36	I have felt dizzy.
	Q37	I have experienced joint pains.
	Q38	I have experienced headaches.
	Q39	I have had a stiff neck and / or shoulders.
	Q40	I have had lower back pain.
	Q41	I have had eyestrain.
	Q42	I have experienced heart palpitations or shortness of breath.
	Q43	I have experienced stomach and / or intestine problems.
	Q44	I have lost my appetite.
	Q45	I have experienced diarrhea and / or constipation.
	Q46	I haven't been able to sleep well.
Harrassment	Q77	I am facing workplace bullying or sexual harassment.
Workplace cohesiveness	Q78	People understand and respect each other at my workplace.
Job satisfaction	Q56	I am satisfied with my work.
Familylife satisfaction	Q57	I am satisfied with my family life.
Work engagement	Q79	I become energized when working.
	Q80	I am proud of my work.

Table S2. Factor loading by different rotations

Rotation: Promax	PA1	PA5	PA3	PA2	PA6	PA4	PA9	PA8	PA7
Proportion explained	0.22	0.19	0.16	0.1	0.08	0.08	0.07	0.06	0.04
Workload (quantity)				0.78					
Workload (quality)				0.8					
Work-life balance (negative)				0.33			0.39		
Physical burden									0.65
Work environment									0.47
Interpersonal relationship at work		0.21			0.4				
Emotional burden					0.55				
Role conflict					0.85				
Job control			0.37	0.21					
Job match			0.9						
Skill utilization			0.32				0.21		
Job meaning			0.83						
Opportunity for growth			0.61				0.2		
Work-life balance (positive)	0.36		0.48						
Support from manager		0.56				0.49			
Support from coworkers						0.84			
Support from families						0.42	0.33		
Rewards (monetary, status)								0.66	
Rewards (respect)		0.42						0.57	
Role clarifies			0.2				0.4		
Job stability							0.43		
Manager's leadership		0.73							
Manager's fairness		0.84							
Workplace with encourages praising		0.7							
Workplace where mistakes are recoverable	0.2	0.46					0.28		
Trust in management	0.7								
Adaptability to change	0.86								
Respect for individuals	0.77								
Fairness in evaluation	0.6								
Approach on diversity	0.46								
Career development	0.63								
RMSEA	0.035								
Tucker Lewis Index	0.958								
BIC	353526.8								

Table S2. (continued)

Rotation: biquartimin	PA1	PA2	PA3	PA5	PA6	PA4	PA8	PA7	PA9
Proportion explained	0.57	0.1	0.07	0.06	0.06	0.04	0.04	0.03	0.03
Workload (quantity)		0.76							
Workload (quality)		0.78							
Work-life balance (negative)	0.27	0.33							0.25
Physical burden								0.53	
Work environment	0.37							0.4	
Interpersonal relationship at work	0.63				0.34				
Emotional burden	0.32				0.47				
Role conflict	0.37				0.71				
Job control	0.52	0.2	0.22						
Job match	0.51		0.6						
Skill utilization	0.32								
Job meaning	0.63		0.53						
Opportunity for growth	0.64		0.36						
Work-life balance (positive)	0.55		0.33	0.21					
Support from manager	0.75					0.33			
Support from coworkers	0.6					0.62			
Support from families	0.35					0.34			0.21
Rewards (monetary, status)	0.45						0.54		
Rewards (respect)	0.68						0.45		
Role clarifies	0.35								0.25
Job stability	0.3								0.25
Manager's leadership	0.76								
Manager's fairness	0.76		-0.21						
Workplace with encourages praising	0.76								
Workplace where mistakes are recoverable	0.7								
Trust in management	0.52			0.42					
Adaptability to change	0.55			0.5					
Respect for individuals	0.71			0.42					
Fairness in evaluation	0.61			0.33					
Approach on diversity	0.59			0.24					
Career development	0.64			0.34					
RMSEA	0.035								
Tucker Lewis Index	0.958								
BIC	353526.8								

Table S3. Regression results of full sample

	Mental health <i>OLS</i>	High- stress risk <i>logistic</i>	Physical health <i>OLS</i>	Work engagement <i>OLS</i>	Job satisfaction <i>OLS</i>	Familylife satisfaction <i>OLS</i>	Harassment <i>OLS</i>	Workplace cohesiveness <i>OLS</i>
Cluster A1	7.817*** (0.049)	-1.834*** (0.058)	4.982*** (0.055)	10.665*** (0.048)	9.372*** (0.047)	7.119*** (0.055)	1.975*** (0.054)	10.019*** (0.050)
Cluster A2	5.701*** (0.043)	-1.604*** (0.047)	3.451*** (0.048)	4.280*** (0.042)	4.624*** (0.041)	2.771*** (0.048)	2.479*** (0.047)	4.812*** (0.043)
Cluster A3	3.250*** (0.033)	-1.245*** (0.028)	1.752*** (0.037)	5.955*** (0.032)	5.188*** (0.031)	3.164*** (0.037)	1.926*** (0.036)	3.924*** (0.033)
Cluster B1	2.522*** (0.042)	-1.401*** (0.040)	2.071*** (0.047)	3.083*** (0.041)	2.018*** (0.040)	0.120** (0.047)	-0.575*** (0.046)	1.426*** (0.042)
Cluster B2	0.696*** (0.036)	-0.885*** (0.027)	0.269*** (0.040)	1.448*** (0.035)	0.951*** (0.034)	-0.840*** (0.040)	0.04 (0.039)	0.254*** (0.036)
Cluster B3 (Reference cluster)								
Cluster C1	-2.101*** (0.045)	0.595*** (0.020)	-1.371*** (0.051)	-8.331*** (0.044)	-7.094*** (0.043)	-1.352*** (0.051)	-1.110*** (0.050)	-5.226*** (0.045)
Cluster C2	-3.066*** (0.028)	0.527*** (0.013)	-2.620*** (0.031)	-3.292*** (0.027)	-3.971*** (0.026)	-2.791*** (0.031)	-2.826*** (0.030)	-3.598*** (0.028)
Cluster C3	-8.720*** (0.032)	1.968*** (0.012)	-5.685*** (0.035)	-5.638*** (0.031)	-7.149*** (0.030)	-1.758*** (0.035)	-2.222*** (0.035)	-4.002*** (0.032)
Cluster D	-9.317*** (0.033)	2.437*** (0.012)	-6.689*** (0.037)	-9.145*** (0.032)	-10.477*** (0.031)	-2.365*** (0.037)	-8.077*** (0.036)	-10.966*** (0.033)
Constant	53.910*** (0.244)	-3.099*** (0.113)	53.642*** (0.273)	52.975*** (0.238)	55.673*** (0.234)	52.034*** (0.273)	52.061*** (0.267)	54.931*** (0.245)
Age fixed	YES	YES	YES	YES	YES	YES	YES	YES
Gender fixed	YES	YES	YES	YES	YES	YES	YES	YES
Sector fixed	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed	YES	YES	YES	YES	YES	YES	YES	YES
Observations	813,365	813,374	813,362	813,347	813,321	813,308	813,353	813,345
R ²	0.281		0.139	0.306	0.318	0.068	0.105	0.276
Adjusted R ²	0.281		0.139	0.306	0.318	0.068	0.105	0.275
Log		-						
Likelihood		235,077.10						
AIC		470,234.20						

Notes: The regression analyses are based on the unbalanced full sample. The cluster with the most population proportion (Cluster B3) is set as reference cluster. The significant level is denoted as follows: *p<0.1; **p<0.05; ***p<0.01.

Parallel Analysis Scree Plots

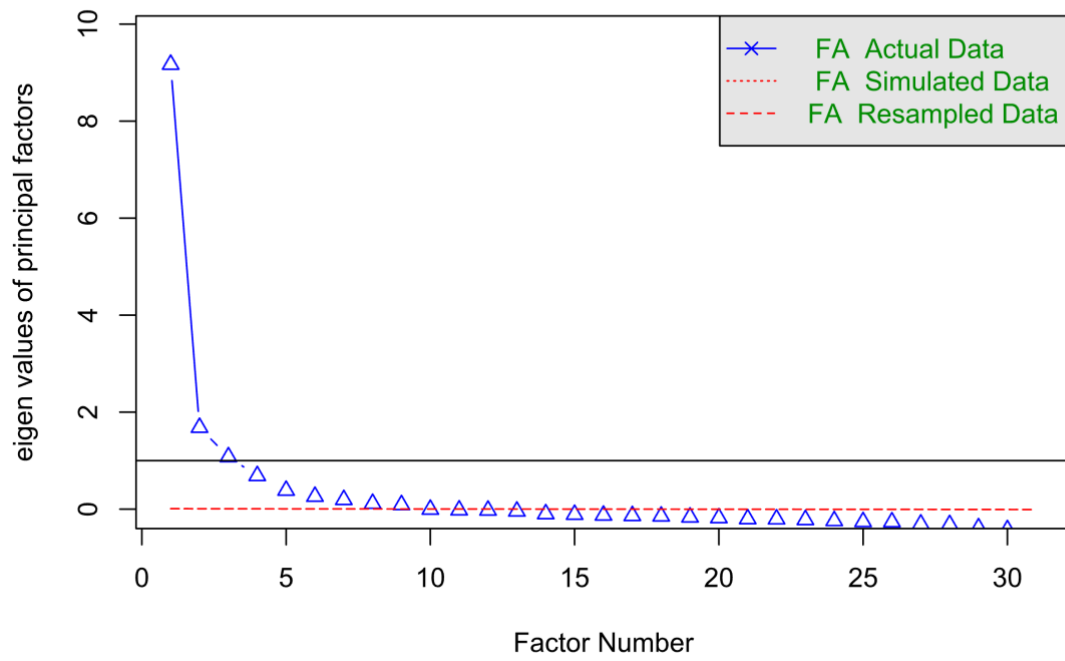


Figure S1. The optimal number of factors

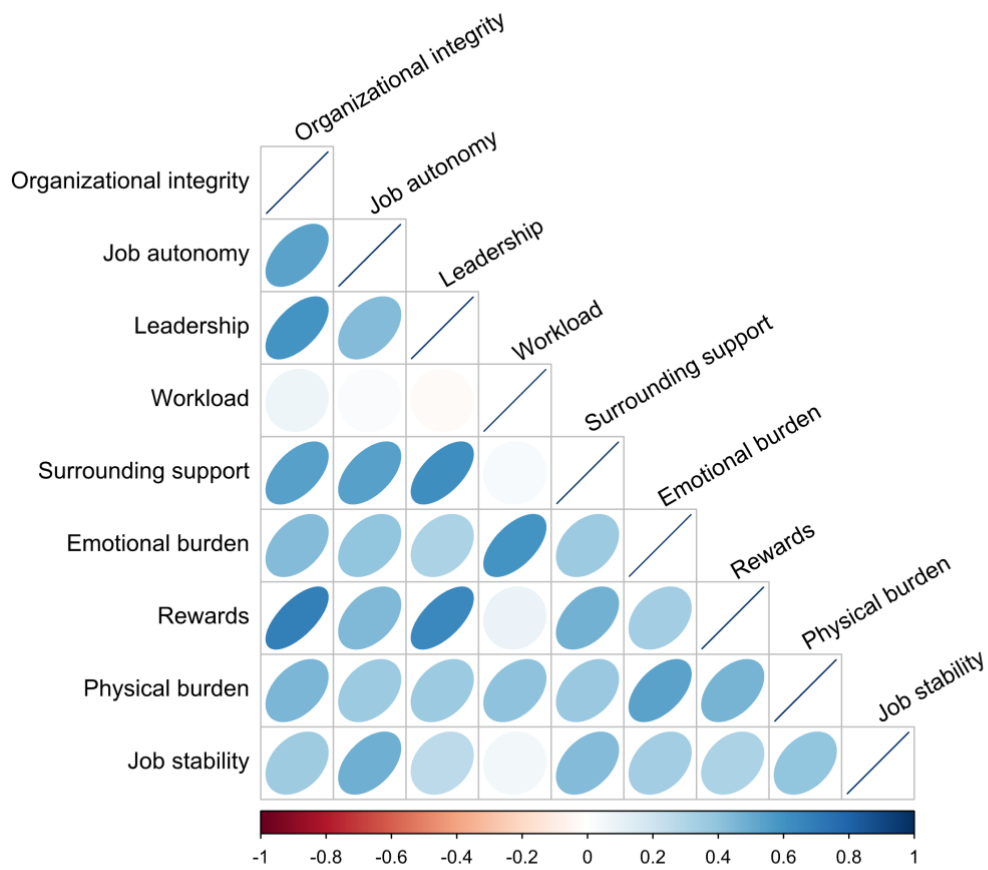


Figure S2. Correlation of workplace factors

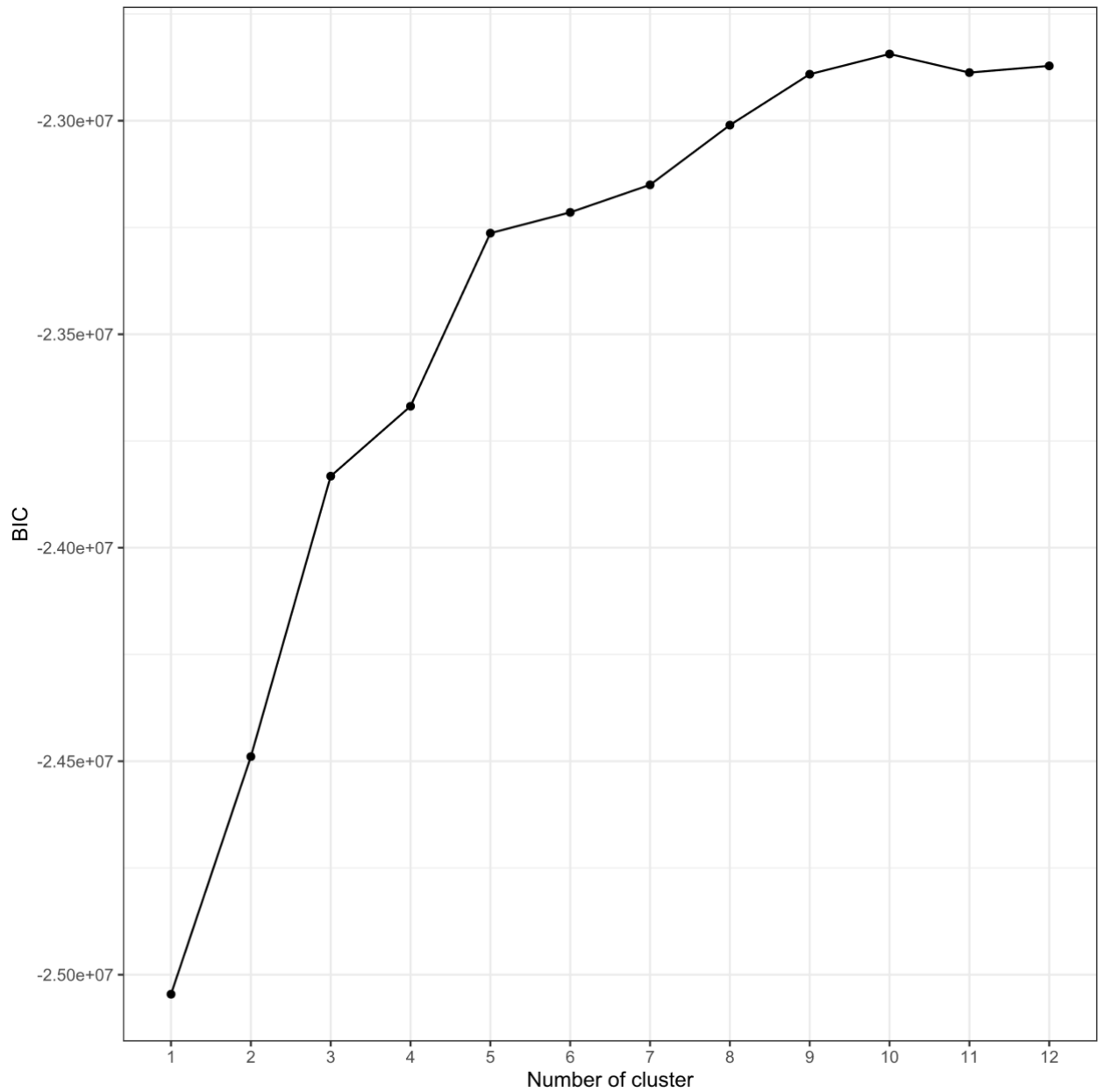


Figure S3. The optimal number of clusters

Notes: The cluster results of other numbers of cluster (6, 7, 8, 9 clusters) analysis are available from the authors. We also compared these results qualitatively and found 10 clusters are better to distinguish the cluster features.

1
2

3
4
5
6

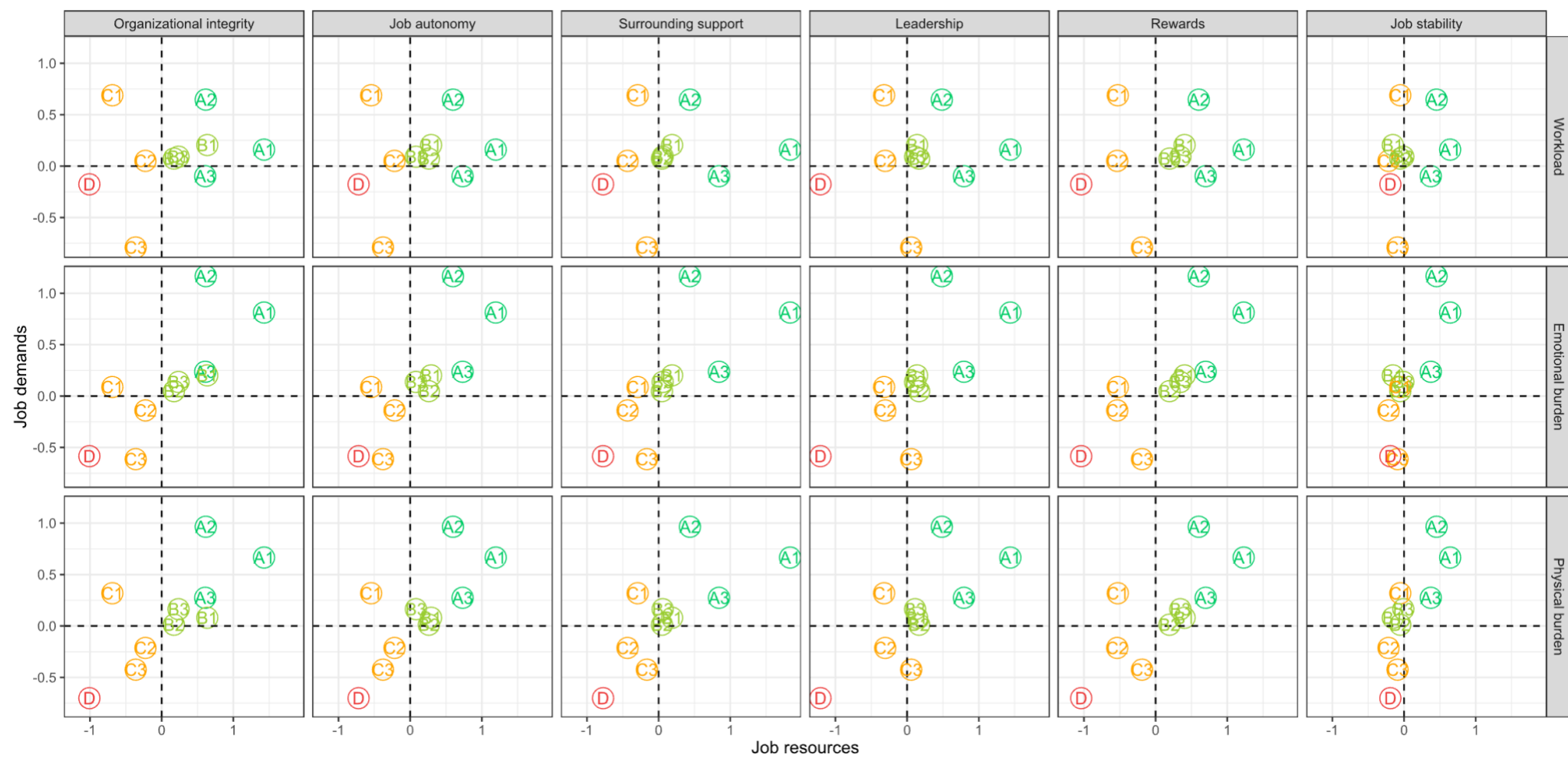


Figure S4. Clusters by Job demands-resources

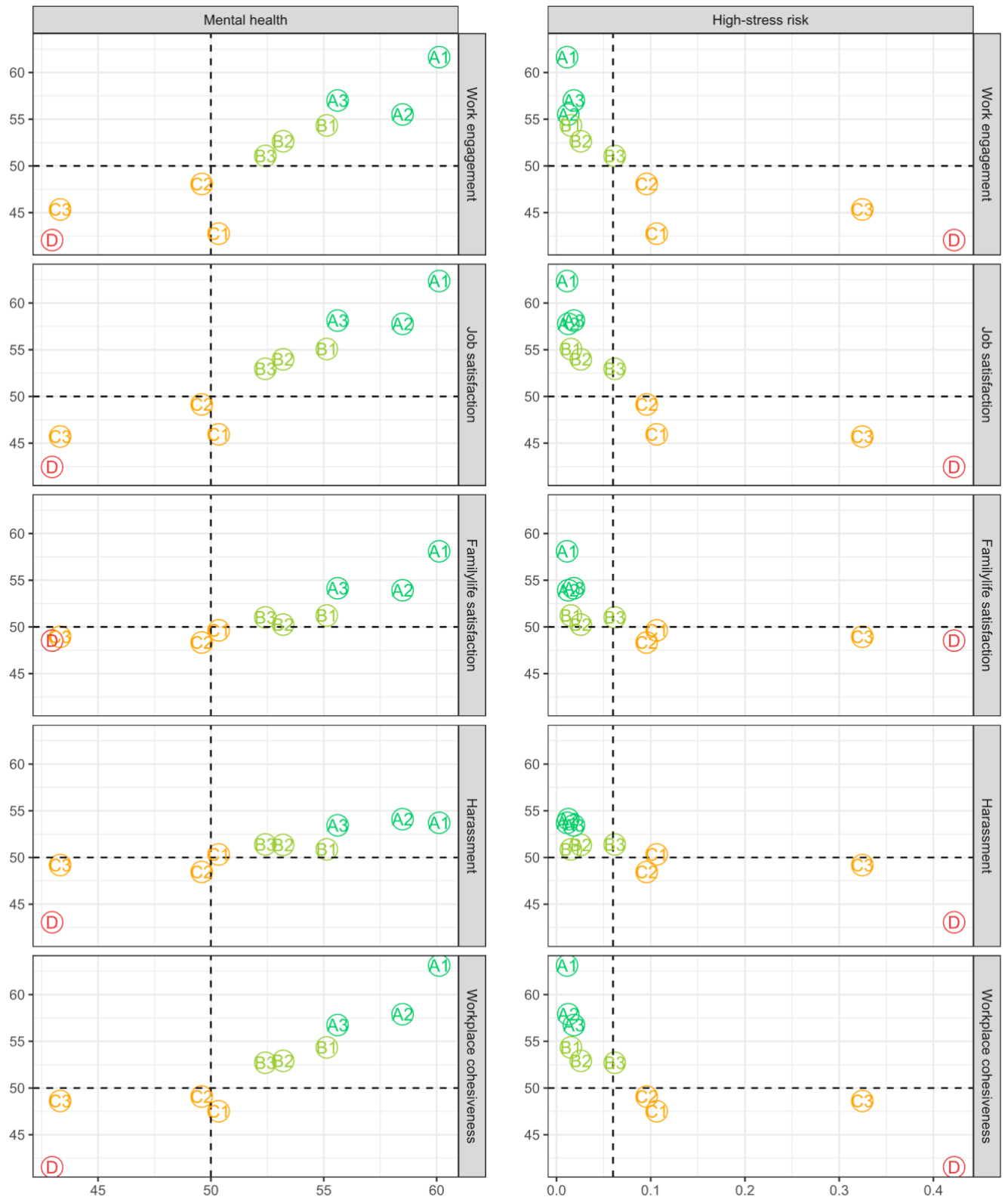


Figure S5. Clusters by employee well-beings

Notes: To test whether the clusters can distinguish employee well-being, pairwise T tests across the 10 clusters are also conducted and the results show significant differences among clusters except for the harassment score between Cluster B2 and B3. Pairwise T-test across years also indicate that clusters significantly distinguish the employee well-beings.

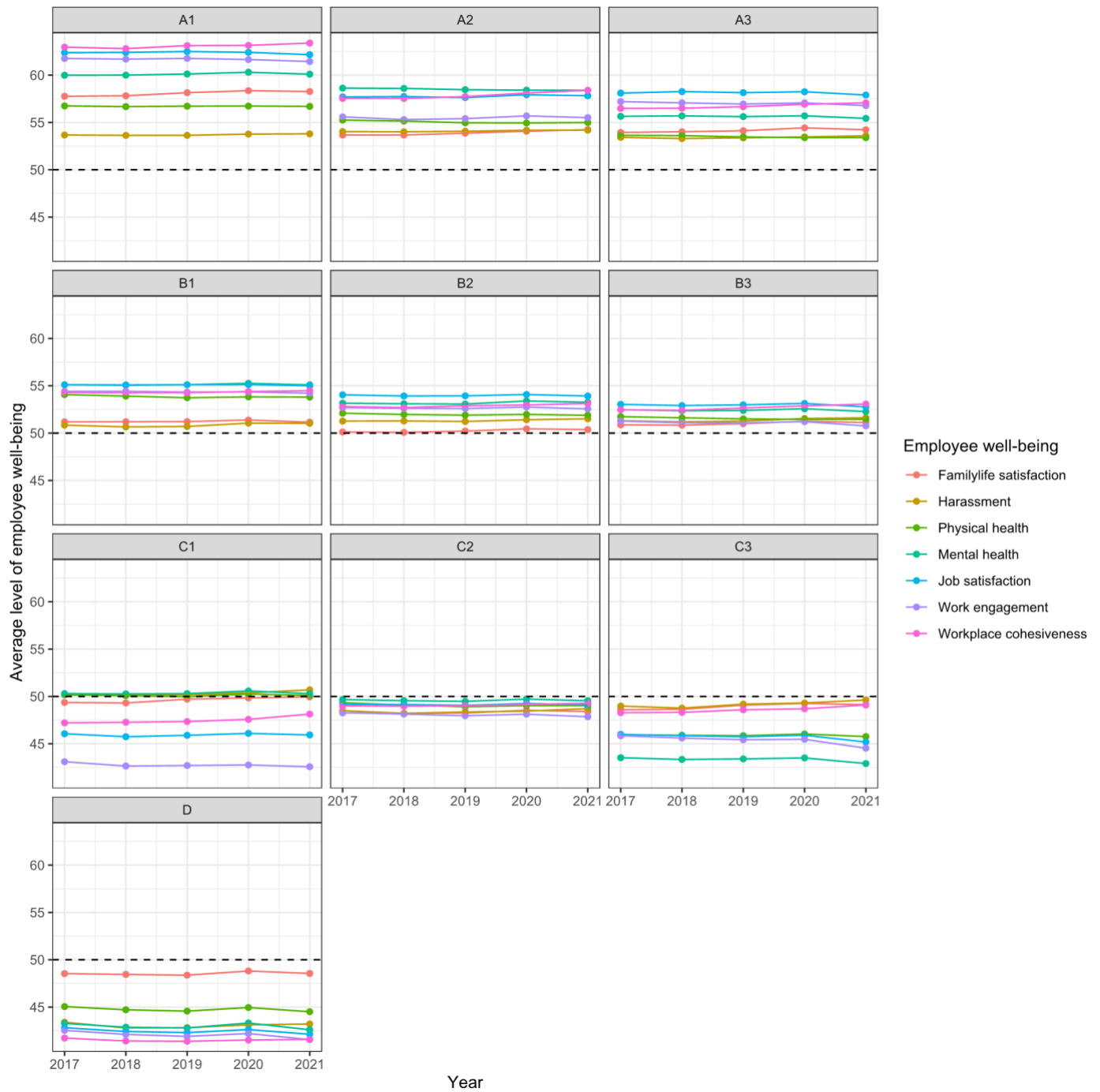


Figure S6. The average levels of employee well-being from 2017 to 2021

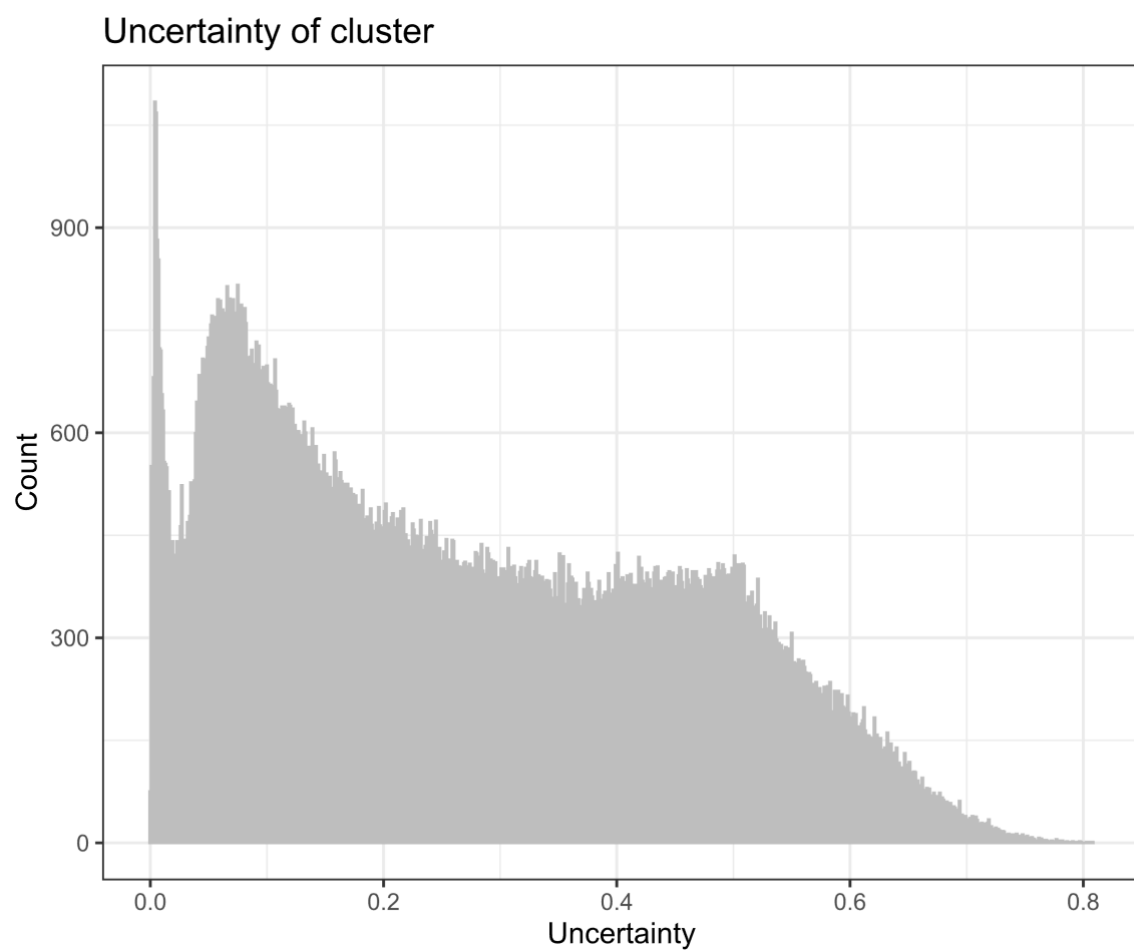


Figure S7. Uncertainty of clustering