

High Cognitive Demands: A challenge or a stressor?

Gérard Näring^{1,2}, Arjella van Scheppingen, Henndy Ginting³

1 Radboud University Nijmegen, the Netherlands

2 COPSOQglobal, the Netherlands

3 School of Business and Management, Bandung Institute of Technology, Bandung, Indonesia



Radboud University



High Cognitive Demands: A challenge or a stressor?

Demands at work -> stress

Cognitive Demands -> stress?

Manual of the COPSOQ II:

“It should be noted that high levels of cognitive demands are considered “healthy” and stimulating”.

a vision that workers experience cognitive demands as challenging



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High Cognitive Demands: A challenge or a stressor?

Demand-Induced Strain Compensation (DISC) Model (De Jonge & Dormann, 2003; 2006)

High demands are a stressor, unless they are accompanied by matching resources
Specification of the Job Demands Resources model: JDR

Cognitive demands should thus be accompanied by cognitive resources

Challenge

investigating this with COPSOQ dimensions.

Problem

Cognitive Resources not part of COPSOQ III

Solution

Measure Cognitive Resources with four items from the COPSOQ:
assess reliability and validity


High Cognitive Demands: A challenge or a stressor?

Cognitive demands only in LONG VERSION.
Therefore not very often part of studies.

Canada. Spain. Sweden. China. France. Iran. Greece. Brasil.
Cognitive Demands not measured

Germany.
Reports reliability on 4 items in II version of .38. Since then not measured

Belgium.
Long version. Cognitive demands: **no** relationship with burnout or stress.

Indonesia 

Netherlands 

High Cognitive Demands: Previous studies

Australia (Dicke etc, etc, & Riley, 2018).
Cognitive demands are subsumed under negative indicators.
Cognitive demands associated with depression

Denmark (Kristensen et al, 2005)
correlations of Cognitive demands with health or vitality are not presented
high correlation of cognitive demands and possibilities for development, $r = .63$

Portugal validation (Rosário , Azevedo, Fonseca, Nienhaus, Nübling, Torres da Costa, 2017)
“items in the scale of Cognitive demands have the highest loadings on three different factors, indicating that the construct validity of this scale is not supported.”

Cognitive Demands in COPSOQ III Long version

CD1: “Do you have to keep your eyes on lots of things while you work?”
CD2 : “Does your work require that you remember a lot of things?”
CD3 : “Does your work demand that you are good at coming up with new ideas?”
CD4 : “Does your work require you to make difficult decisions?”



Cognitive RESOURCES

An employee has access to Cognitive Resources if

1. he/she can decide when to take a mental break
2. can alternate complex tasks with simple tasks
3. has access to useful information or gets this information from others
4. has the opportunity to utilize his/her skills and intellectual capabilities (de Jonge et al., 2007).

Operationalization of Cognitive Resources with four items from the COPSOQ

CT1: "Can you decide when to take a break?"

VA1: "Is your work varied"

PR2: "Do you receive all the information you need in order to do your work well?"

PD3: "Can you use your skills or expertise in your work?"



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Large study in State Electricity Company Indonesia (N = 1421)

Cognitive demands (CD) and Burnout (BO) $r = .39$ (N = 1421, $p < .0001$)

According to the DISC model Cognitive Resources might moderate this relationship.

High Cognitive Demands: A challenge or a stressor?



Cognitive resources

Cronbach's Alpha = .52

Deletion of the item "Can you decide when to take a break" would increase the alpha to .55, but we kept all four items

Cognitive demands (CD)

Cronbach's Alpha = .74

Burnout (BO)

Cronbach's Alpha = .90

Stress Scale (ST)

Cronbach's Alpha = .89

Work Engagement (WE1, WE2)

Cronbach's Alpha = .78

Work Engagement (WE1, WE2, WE3)

Cronbach's Alpha = .64



Cognitive demands and burnout.



REGRESSION of **BURNOUT** on cognitive demands and cognitive resources.

cognitive demands

beta = .62, $p < .001$

cognitive resources

n.s.

cognitive demands x cognitive resources

beta = -.52, $p < .001$

explained $R^2 = .10$

Although theoretically important, cognitive demands are not an important source of burnout in this sample.



Cognitive demands and stress



REGRESSION of **STRESS** on cognitive demands and cognitive resources.

cognitive demands	$\beta = .63, p < .001$
cognitive resources	n.s.
cognitive demands x cognitive resources	$\beta = -.51, p = .016$

explained $R^2 = .12$

cognitive demands seem to be a stressor
the influence of these demands can be moderated by cognitive resources



Cognitive demands and health



REGRESSION of **HEALTH** on cognitive demands and cognitive resources.

cognitive demands	$\beta = -.67, p < .001$
cognitive resources	n.s.
cognitive demands x cognitive resources	$\beta = .88, p < .001$

explained $R^2 = .08$

cognitive demands seem to have a negative influence on health
cognitive resources can moderate this influence



Cognitive demands and health



REGRESSION of **ENGAGEMENT** on cognitive demands and cognitive resources.

cognitive demands	n.s.
cognitive resources	$beta = .54, p < .001$
cognitive demands x cognitive resources	n.s.

explained $R^2 = .29$



High Cognitive Demands: A challenge or a stressor?



Chemical Industry (R&D; lab; shift workers; financial; sales; etc)
N = 598 normal working hours. Minimum of 24 hrs.

Cognitive demands (CD)	<i>Cronbach's Alpha</i> = .70
Burnout (BO)	<i>Cronbach's Alpha</i> = .88
Stress (ST)	<i>Cronbach's Alpha</i> = .86
Work Engagement (WE)	<i>Cronbach's Alpha</i> = .78
Self-rated Health (GH1)	

Cognitive resources	<i>Cronbach's Alpha</i> = .47
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The reliability of the "ad hoc" assembled scale for cognitive resources is not high enough Deletion of the item "Can you decide when to take a break" would increase the alpha to .51, but we kept all four items



Cognitive demands and burnout.



REGRESSION of **BURNOUT** on cognitive demands and cognitive resources.

cognitive demands	$\beta = .21, p < .001$
cognitive resources	$\beta = -.30, p < .001$
cognitive demands x cognitive resources	<i>n.s.</i>

explained $R^2 = .12$

Although theoretically important, cognitive demands are not an important source of burnout in this sample.



Cognitive demands and stress



REGRESSION of **STRESS** on cognitive demands and cognitive resources.

cognitive demands	$\beta = .16, p < .001$
cognitive resources	$\beta = -.24, p < .001$
cognitive demands x cognitive resources	<i>n.s.</i>

explained $R^2 = .08$

cognitive demands seem to be a stressor of which the influence can be countered by cognitive resources.



Cognitive demands and health



REGRESSION of **HEALTH** on cognitive demands and cognitive resources.

cognitive demands		n.s.
cognitive resources	$\beta = .28,$	$p < .001$
cognitive demands x cognitive resources		n.s.

explained $R^2 = .08$



Cognitive demands and health



REGRESSION of **ENGAGEMENT** on cognitive demands and cognitive resources.

cognitive demands		n.s.
cognitive resources	$\beta = .39,$	$p < .001$
cognitive demands x cognitive resources		n.s.

explained $R^2 = .15$

Cognitive resources seem to be an important determinant of engagement



Cognitive demands
Summary of regression analyses

Burnout	$R^2 = .10$		$R^2 = .12$	
demands	.62		.21	
resources			-.30	
demands x resources	-.52			
Stress	$R^2 = .12$		$R^2 = .08$	
demands	.63		.16	
resources			-.24	
demands x resources	-.51			

Cognitive demands
Summary of regression analyses

Health	$R^2 = .08$		$R^2 = .08$	
demands	-.67			
resources			.28	
demands x resources	.88			
Engagement	$R^2 = .29$		$R^2 = .15$	
demands				
resources	.54		.39	
demands x resources				

Comment on low reliability of scale: Cognitive Resources

Can we trust the results from an instrument with low reliability?



Definitely not if results are not significant.

Low reliability increases random error and thus lowers power.

If results are significant, the low power indicates that the correlation found is **so large** that it produces significant results **in spite** of the low power



Conclusion

Cognitive demands are not by definition beneficial, they seem to contribute to burnout and stress

In line with the DISC model, they may contribute to engagement, but only in the presence of enough cognitive resources. Cognitive resources per se are a more important determinant of engagement.

