1 JD-R Theory: Using the Content of the O*Net

2 First Author[1] & Ernst-August Doelle[1,2]

3 [1] Wilhelm-Wundt-University

4 [2] Konstanz Business School

5 Author Note

6 Add complete departmental affiliations for each author here. Each new line herein

7 must be indented, like this line.

8 Enter author note here.

9 The authors made the following contributions. First Author: Conceptualization,

10 Writing - Original Draft Preparation, Writing - Review & Editing; Ernst-August Doelle:

11 Writing - Review & Editing.

12 Correspondence concerning this article should be addressed to First Author, Postal

13 address. E-mail: my@email.com

14   JD-R Theory: Using the Content of the O*Net

15   The Job Demands-Resources Theory [JD-R; Demerouti et al. (2001)] has received

16   wide support across contexts and varied research questions. We add to this literature via

17   two routes: by utilizing some of the job characteristics in the popular O*Net, and by

18   focusing on perceptions of all characteristics as demands/resources. Specifically, we explore

19   the interaction between perceptions of job demands and resources on the outcome of stress

20   across a wide range of occupations. Here, respondents made a series of evaluations that

21   used: direct O*Net terminology (both descriptor and response option), and JD-R

22   influenced ratings of demand and hindrance stressors. Prior to a description of results, a

23   brief overview of both the JD-R theory, the stress appraisal process, and O*Net, is

24   provided.

25   **The Job demands-Resources Theory**

26   The job demands-resources theory is an expansion of the well-studied job

27   demands-resources model (Demerouti et al., 2001). One of the major advantages of the job

28   demands-resources theory is that it allows us to model both work environment and job

29   characteristics via job resources and demands, which are thoroughly documented by job in

30   O*Net. *Resources* are defined as physical, psychological, social, or organizational aspects of

31   the job that may help an employee achieve work goals, reduce job demands, or promote

32   personal growth and development (Demerouti et al., 2001). *Demands*, on the other hand,

33   include components of a job that require sustained effort, and as such, produce

34   psychological or physiological strain (e.g., high work pressure; Demerouti et al. (2001)).

35   Cognitively, the perception of an element of one's job as a resource or demand

36   activates one of two unique processes: health impairment (resulting from demands) or

37   motivation [resulting from resources; A. B. Bakker and Demerouti (2014)]. Demanding job

38   characteristics are frequently associated with negative outcomes (e.g., A. Bakker et al.,

2003), whereas job characteristics deemed resources have been associated with positive

organizational outcomes like engagement and motivation (A. B. Bakker et al., 2007). Our

focus is on whether or not having more resources serves as a buffer to the demand-stress

relationship. One of the stickier elements of this question surrounds the subjective nature

of demands/resources, which we address next.

Objective vs. Subjective Nature of Demands and Resources: The Role of Appraisal

Searle and Auton (2015) note that much of our research on workplace demands is

based on apriori classifications of demands. For instance, we assume that generally, time

pressure is a negative demand on an employee. However, the stress experience, or process,

described early on by Lazarus and Folkman (1984) is grounded in the assumption that

individual appraisals of stressors/demands vary. Their transactional theory of stress and

coping states that people continuously appraise stimuli in their environments. An appraisal

is the cognitive process whereby meaning is assigned to a stimulus. If a stimulus is

appraised as a stressor (threat, challenge, potentially harmful), emotional distress leads to

coping of some kind. This action to cope is also associated with another appraisal about

the outcome itself and the process continues if the outcomes is not appraised as favorable

(Lazarus & Folkman, 1984). As such, the stress appraisal process suggests that classifying

a job characteristic or environmental condition as an objective demand or resource might

be in error.

We next consider the empirical evidence on the subjective nature of demands and

resources. First, as hinted at above, some research suggests that job demands and

resources may not be universally appraised or assigned as such. Starting with job demands,

Webster et al. (2011) studied workload, role ambiguity, and role conflict demands, and

found that while each could be appraised primarily as a challenge or hindrance demand,

they could also simultaneously be perceived as being *both* a challenge and hindrance to

different degrees. While their study not did include resources, it documents individual

differences in how people perceive stressors at work. Although not the primary focus of

their paper, Sonnega et al. (2018) compared self-reported (subjective) ratings of degree of

physical demand, stress, and need for intense concentration from the Health and

Retirement Study with objective ratings from O*Net. Correlations physical demand (r =

.52), stress (r = .10), and need for intense concentration (r = .14), again suggesting

perhaps that our objective ratings of job demands (and resources) may be subject to a

greater level of individual difference than we tend to think. While the above two studies

provide evidence for variability in perception of demands, Schmitz et al. (2019) captured

subjective and objective resources in their study of retirement. Correlations of composite

variables between subjective and objective measures for the resources of autonomy (r =

.12. p > .01), recognition of work (r = .07, p > .01), and decision freedom (r = .08, p >

.01), while significant, certainly do not reflect high levels of overlap. We do acknowledge as

well, that demands and resources are not necessarily consistent across days, or seasons, for

many employees. Downes et al. (2021) meta-analysis addresses this reality in depth,

although it is beyond the scope of this project.

Thus, while it is cleaner to be able to categorize job characteristics as *either* a

demand or a resource, the above research suggests that individual appraisal is an

important consideration. It is quite possible that one person experiences high work

pressure (commonly cited as a demand in the literature) as a hindrance stressor and thus

experiences strain, and another thrives in a fast-paced pressured role and would thus find

the environment motivating. Here, we asked respondents to rate all of the job

characteristics in terms of hindrances, challenges, and resources.

Value of exploring the O*Net Resource

First, the Occupational Information Network (O*NET; onetonline.org) contains a

comprehensive description of occupations (Peterson et al., 2001). This widely accessed

database houses hundreds of standardized and occupation-specific descriptors most

occupations in the US and these descriptions are continually updated. These data, and the

tools provided for free on the website (e.g., Career Exploration Tools, "My Next Move,"

Toolkit for Business) are frequently used by counselors, students, human resources

departments, and researchers to assist potential applicants discover the skills and training

they need for the job of their choice. It is also useful to employers by providing them with

information with which to craft job descriptions and help employees determine what skills

are needed for promotion. We utilized statements taken from O*NET "activity" and

"context" classifications (e.g., items related to information input, interacting with others,

physical work conditions, structural job characteristics).

Current Study and Hypotheses

These data were taken from a larger study on JD-R theory as it applies to O*NET

items. Our specific interest in the current study is in whether or not *perceptions* of

hindrance demands are postitively related to perceived stress, and whether or not this

relationship is moderated by perceived resources. The Job demands-Resources theory

would suggest resources would buffer this relationship. We do have some existing evidence

that this occurs with other outcomes. For example, Tadic et al. (2015) found that daily

hindrance job demands were negatively related to both positive affect and engagement in a

sample of primary school teachers. Daily job resources, in this sample, buffered the

relationships between hindrances and affect and engagement. Here, we propose that

perceived resources generally, as opposed to daily, would also buffer the relationship

between perceived hindrance stressors and, in this, case, perceived stress. The following

two predictions are made:

H1. There is a positive relationship between perceived hindrance stressors and stress.

H2. The relationship between mean perceived hindrances and stress will be moderated

by resources such that this relationship is diminished as perceived resources increase.

NOTES: Add: Challenge versus hindrance job demands and wellbeing: A diary study on the moderating role of job resources Add a correlation table to speak to H1. Reference H1 and H2 in the results section.

Methods

There were 568 respondents.

Participants.

- 568 respondents, 13.57% had been in their referent job less than 6 months, 19.20% between 6 months and a year, 49.12% between one and five years, 13.27% between 5 and 10 years, and 4.87% more than 10 years.
- Ages ranged from 18 to 65 with an average of 28.18 years old (SD = 7.53).
- Gender: female (52.58%) or male (46.83%).
- Job classifications: International Standard Classification of Occupations (ISCO) via the package `labourR` (**R-labourR?**), and further categorized into "knowledge" (n = 320) versus "skilled" (n = 214) occupations with knowledge workers being identified via ISCO classifications of: 1) professionals, and 2) managers.

The data for this study were collected through Prolific sample,18 or older and holding a full-time or part-time job. Participants were asked to think about their primary job while answering the survey, and upon completion each participant was compensated in the amount of six US dollars.

Materials

We used 98 statements taken directly from O*Net's "activity" and "context" classifications. Each of the 98 descriptors has potentially unique response categories, but

scaling was consistently 1 (low) to 5 (high). Subsequent to these self-evaluations,

respondents were asked to rate elements in terms of 1) . . . this aspect of your job is a

resource that can be functional in achieving work goals, reduce job demands, or stimulate

personal growth/development, 2) . . . this aspect of your job is a challenge that can promote

mastery, personal growth, or future gains, and 3) . . . this aspect of your job is a hindrance

that can inhibit personal growth, learning, and work goal attainment.

Procedure

We used PROCESS for R Version 4.1.1 (Hayes, 2022) to assess the extent to which

the relationship between demands and stress are moderated by resources.

Results

```
##
## ******************** PROCESS for R Version 4.1.1 ********************
##
##            Written by Andrew F. Hayes, Ph.D.  www.afhayes.com
##    Documentation available in Hayes (2022). www.guilford.com/p/hayes3
##
## ********************************************************************
##
## PROCESS is now ready for use.
## Copyright 2022 by Andrew F. Hayes ALL RIGHTS RESERVED
## Workshop schedule at http://haskayne.ucalgary.ca/CCRAM
##


##
## ******************** PROCESS for R Version 4.1.1 ********************
```

```
163  ##
164  ##              Written by Andrew F. Hayes, Ph.D.   www.afhayes.com
165  ##       Documentation available in Hayes (2022). www.guilford.com/p/hayes3
166  ##
167  ## ************************************************************************
168  ##
169  ## Model : 1
170  ##       Y : stress
171  ##       X : overall.hindrance
172  ##       W : overall.resource
173  ##
174  ## Sample size: 568
175  ##
176  ##
177  ## ************************************************************************
178  ## Outcome Variable: stress
179  ##
180  ## Model Summary:
181  ##           R      R-sq      MSE        F       df1       df2         p
182  ##      0.1311    0.0172    0.7790    3.2876    3.0000  564.0000    0.0205
183  ##
184  ## Model:
185  ##                    coeff        se         t         p      LLCI      ULCI
186  ## constant          1.2688    1.0055    1.2618    0.2075   -0.7063    3.2439
187  ## overall.hindrance 0.8336    0.4031    2.0677    0.0391    0.0417    1.6254
188  ## overall.resource  0.3319    0.2518    1.3181    0.1880   -0.1627    0.8264
189  ## Int_1            -0.1918    0.1024   -1.8725    0.0616   -0.3929    0.0094
```

```
190 ##
191 ## Product terms key:
192 ## Int_1  :  overall.hindrance  x  overall.resource
193 ##
194 ## Test(s) of highest order unconditional interaction(s):
195 ##        R2-chng          F        df1        df2          p
196 ## X*W      0.0061     3.5064     1.0000   564.0000     0.0616
197 ## ----------
198 ## Focal predictor: overall.hindrance (X)
199 ##        Moderator: overall.resource (W)
200 ##
201 ## Conditional effects of the focal predictor at values of the moderator(s):
202 ##    overall.resource      effect        se         t          p        LLCI        ULCI
203 ##              3.2983      0.2010    0.0802    2.5065     0.0125      0.0435      0.3586
204 ##              3.7402      0.1163    0.0534    2.1759     0.0300      0.0113      0.2213
205 ##              4.2063      0.0269    0.0594    0.4535     0.6503     -0.0897      0.1435
206 ##
207 ## Moderator value(s) defining Johnson-Neyman significance region(s):
208 ##        Value    % below    % above
209 ##       3.8196    55.6338    44.3662
210 ##
211 ## Conditional effect of focal predictor at values of the moderator:
212 ##    overall.resource      effect        se         t          p        LLCI        ULCI
213 ##              1.0149      0.6389    0.3003    2.1276     0.0338      0.0491      1.2288
214 ##              1.2078      0.6020    0.2809    2.1433     0.0325      0.0503      1.1536
215 ##              1.4006      0.5650    0.2615    2.1608     0.0311      0.0514      1.0785
216 ##              1.5935      0.5280    0.2421    2.1807     0.0296      0.0524      1.0035
```

```
## 217       1.7863    0.4910    0.2228    2.2034    0.0280    0.0533    0.9287

## 218       1.9791    0.4540    0.2037    2.2293    0.0262    0.0540    0.8540

## 219       2.1720    0.4170    0.1846    2.2592    0.0243    0.0545    0.7796

## 220       2.3648    0.3801    0.1657    2.2937    0.0222    0.0546    0.7055

## 221       2.5577    0.3431    0.1470    2.3336    0.0200    0.0543    0.6318

## 222       2.7505    0.3061    0.1287    2.3791    0.0177    0.0534    0.5588

## 223       2.9434    0.2691    0.1108    2.4292    0.0154    0.0515    0.4867

## 224       3.1362    0.2321    0.0937    2.4784    0.0135    0.0482    0.4161

## 225       3.3290    0.1951    0.0778    2.5085    0.0124    0.0423    0.3479

## 226       3.5219    0.1582    0.0641    2.4667    0.0139    0.0322    0.2841

## 227       3.7147    0.1212    0.0543    2.2306    0.0261    0.0145    0.2279

## 228       3.8196    0.1011    0.0515    1.9642    0.0500    0.0000    0.2021

## 229       3.9076    0.0842    0.0507    1.6605    0.0974   -0.0154    0.1838

## 230       4.1004    0.0472    0.0545    0.8662    0.3867   -0.0599    0.1543

## 231       4.2933    0.0102    0.0644    0.1589    0.8738   -0.1163    0.1368

## 232       4.4861   -0.0267    0.0782   -0.3421    0.7324   -0.1803    0.1268

## 233       4.6790   -0.0637    0.0941   -0.6773    0.4985   -0.2485    0.1211

## 234       4.8718   -0.1007    0.1112   -0.9054    0.3656   -0.3192    0.1178

## 235

## 236 ## Data for visualizing the conditional effect of the focal predictor:

## 237 ##   overall.hindrance overall.resource    stress

## 238 ##           1.6667           3.2983    2.6985

## 239 ##           2.2894           3.2983    2.8237

## 240 ##           3.2416           3.2983    3.0151

## 241 ##           1.6667           3.7402    2.7039

## 242 ##           2.2894           3.7402    2.7763

## 243 ##           3.2416           3.7402    2.8871
```

```
## 244  ##              1.6667        4.2063    2.7096

## 245  ##              2.2894        4.2063    2.7264

## 246  ##              3.2416        4.2063    2.7520

## 247  ##

## 248  ## ******************* ANALYSIS NOTES AND ERRORS ***********************

## 249  ##

## 250  ## Level of confidence for all confidence intervals in output: 95

## 251  ##

## 252  ## W values in conditional tables are the 16th, 50th, and 84th percentiles.
```

Table 1 presents correlations among the study variables of interest.

To explore H2, a moderated regression including hindrances, resources, and the interaction between them was done using PROCESS, version 4.1.1. First, the overall regression model including mean hindrances, mean resources, and the interaction between the two variables was significant, $F(3, 564) = 3.29$, $p = .020$. The interaction between hindrance and resources (uncentered) revealed that the relationship between hindrances and stress was conditional on resources, $F(3, 564) = 3.51$, $p = .061$, providing tentative support for H2. As can be seen in Figure 1, those with fewer resources show a much stronger positive relationship between hindrances and stress than those with more resources. Upon exploring the interaction further, it was evident that this moderated effect happened at lower, but not higher levels of resources.

Discussion

265   **References**

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Table 1

Results from a regression analysis examining the moderation of resources on the relationship between hindrance demands and stress

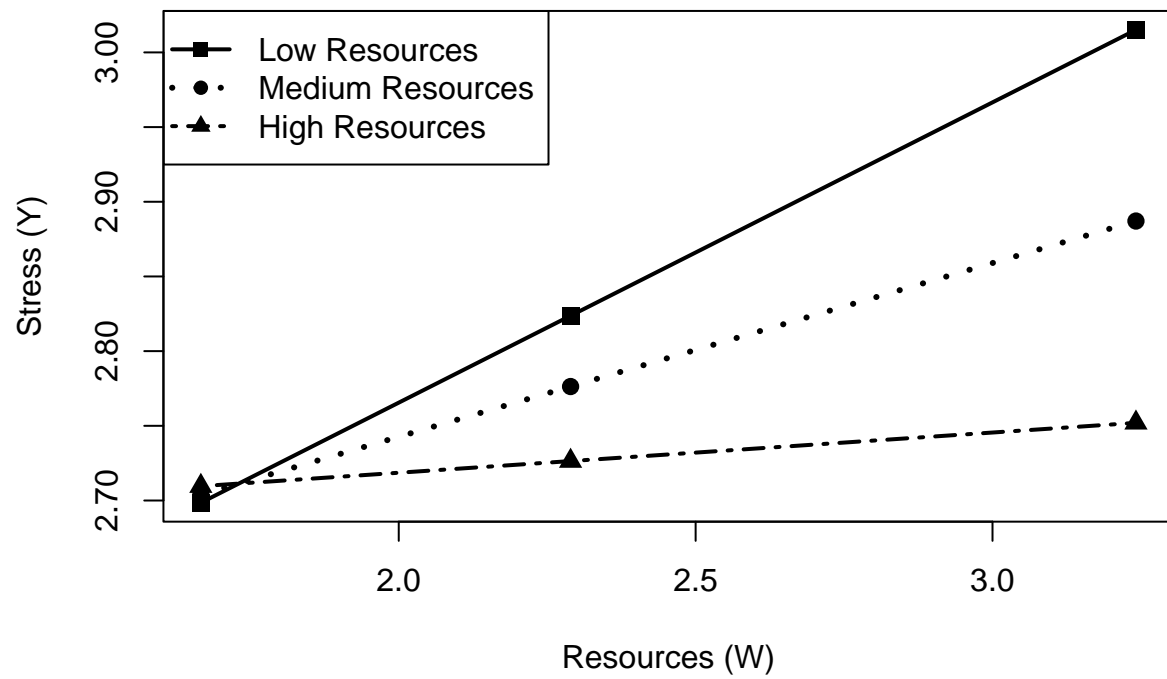| Component	coeff	SE	t	p
Constant	1.27	1.01	1.26	0.21
Hindrance (X)	0.83	0.40	2.07	0.04
Resource (W)	0.33	0.25	1.32	0.19
Hindrance x Resource	-0.19	0.10	-1.87	0.06

Note. R^2 etc here

Figure 1. Interaction between hindrances and resources as predictors of stress