In the wake of the paradigms of positive psychology and positive organizational behavior, the Job Demands-Resources model (JD-R) identifies a wide array of significant links between both positive and negative aspects of work environments and individual and organizational outcomes. This study tested the basic assumptions of the JD-R model on a sample of 751 Italian employees. Through the use of structural equation modelling it was found that workload was positively associated with strain, while job resources were positively associated with occupational self-efficacy and work engagement, and negatively with strain; finally, self-efficacy did not mediate the link between job resources and work engagement. Hypothesized relations, consistent with the JD-R model, were confirmed except that occupational self-efficacy was not associated with work engagement. Results were discussed on the basis of the literature and the practical and applied implications.

Key words: JD-R model; Job resources; Job demands; Personal resources; Occupational self-efficacy.

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The results of the 2010 European working conditions survey, carried out on about 44,000 workers from 34 European countries (Eurofound, 2012), stressed once again that quality of working conditions and occupational health are important and relevant issues to workers and their employers. Of those 44,000 workers, 36,372 were from the 27 States of the European Union. Of those interviewed from EU 27, 59.2% said yes to the question “Does your job involve working at very high speed?” as opposed to 59.6% in the previous 2005 survey, and 24.2% said yes to the question “Do you think your health or safety is at risk because of your work?” as opposed to 28.6% in the previous survey. This evidence, along with recent amendments to European law and the growing interest of the public opinion and businesses, highlights the importance of responding to the issues of risk prevention and promotion of occupational health and safety.

In the wake of recent paradigmatic shifts fostered by positive psychology (Seligman & Csikszentmihalyi, 2000) and, more specifically, by positive organizational behavior (Luthans, 2002), scholars gradually changed their focus from a restricted (Karasek, 1979; Sutherland & Cooper, 1988) to a more integrated and complex view stressing the interplay between positive and negative features of work environments and experiences. Considering the most recent studies about occupational health, the Job Demands-Resources model (JD-R) identifies a wide array of significant links between both positive and negative aspects of work environments. It predicts...
their effects on the overall organization (Salanova, Agut, & Peirò, 2005) and individual outcomes such as, primarily, performance and work engagement (Bakker, 2011; Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001).

Studies testing the basic assumptions of this model regarding the negative effects job demands have on individual wellbeing (Lee & Ashforth, 1996) and the positive effects job resources have on work engagement (Bakker & Demerouti, 2008) are now numerous and show significantly concordant results. At the same time, the number of studies examining the effects of personal resources (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007) has also increased. According to Bakker, Demerouti, and Schaufeli (2003) “the JD-R model is a heuristic model that specifies how health impairment and motivation or involvement in any organization may be produced by two specific sets of working conditions” (pp. 394-395), job demands and job resources.

Job demands are those physical, social or organizational aspects of a job that require sustained physical and/or psychological effort. They include, among others, workload, work pace, occupational uncertainty. Job demands are not necessarily negative, but can contribute to the resources depletion process to the extent that an individual is unable to cope with. From a theoretical point of view, the authors postulated the so-called health impairment process, according to which higher job demands requiring excessive and prolonged labor can contribute to exhausting individual psycho-physiological resources and eventually lead to energy depletion and health problems.

Job resources are those physical, social and organizational aspects of the job that: a) help employees achieve work-related goals; b) reduce job demands and related physiological and psychological costs, and c) stimulate personal growth and development. They include, among others, job autonomy, opportunities for career advancement and development, social support from co-workers. Their positive effects can be explained by two perspectives: i) the motivational process (Bakker, 2009), which states that job resources foster employee development, learning and potential; and ii) Meijman and Mulder’s (1998) effort-recovery approach, according to which workplaces that have a wealth of resources encourage individuals to make voluntary efforts.

The JD-R model has recently been expanded by its authors (Xanthopoulou et al., 2007) to include “personal resources,” a cluster of variables pertaining to individual resilience (Hobfoll, Johnson, Ennis, & Jackson, 2003) or psychological capital (Luthans, Avey, Avolio, Norman, & Combs, 2006). Variables such as optimism, self-efficacy, and self-esteem can have positive effects on employees’ wellbeing and engagement. In particular, van den Heuvel, Demerouti, Bakker, and Schaufeli (2010) defined personal resources as “lower-order, cognitive-affective aspects of personality; developable systems of positive beliefs about one’s self (e.g., self-esteem, self-efficacy, mastery) and the world (e.g., optimism, faith) which motivate and facilitate goal-attainment, even in the face of adversity or challenge” (p. 129). From a theoretical point of view, such conceptualization is connected to two perspectives. The first one is the cognitive adaptation theory (Taylor, 1983), which states that individuals who are able to adjust well to stress have a healthy dose of optimism, self-esteem and personal control. The second one is the positive organizational behavior approach which focuses on “the study and application of positively oriented human resource strengths and psychological capacities that can be measured, developed and effectively managed for performance improvement in today’s workplace” (Luthans, Youssef, & Avolio, 2007, p. 10).
With regard to outcome variables, scholars primarily focused on the so-called work engagement, which they defined as a “positive, fulfilling, and work-related state of mind that is characterized by vigor, dedication and absorption” (Schaufeli, Salanova, González-Romá, & Bakker, 2002, p. 74). According to Bakker, Albrecht, and Leiter (2011) “work engagement captures how workers experience their work: as stimulating and energetic and something to which they really devote time and effort (the vigor component); as a significant and meaningful pursuit (dedication); and as engrossing and something on which they are fully concentrated (absorption)” (p. 5). Many studies identified several significant connections between work engagement and multiple constructs salient to occupational health and organizational performance. In particular, Bakker, Demerouti, and Verbeke (2004) found that higher levels of work engagement were connected to more positive evaluations from coworkers with regard to in-role and extra-role performance. Salanova and colleagues (2005), examining a sample of contact employees, showed that work engagement influenced the workplace environment, which in turn influenced individual performance and customer loyalty. Finally, Xanthopoulou, Bakker, Demerouti, and Schaufeli (2009), using a diary method to study fast-food employees, showed that daily variations in levels of work engagement influenced financial returns.

The other outcome traditionally included in the JD-R model refers to wellbeing, from time to time considered and evaluated as, for example, strain, exhaustion. Demerouti and colleagues (2001), as well as Schaufeli and Bakker (2004), found moderate negative connections between work engagement and psycho-physical problems, such as headaches. Hakanen, Bakker, and Schaufeli (2006) showed that work engagement was positively associated with wellbeing.

STUDY AIMS AND HYPOTHESES

This study aims to examine the basic assumptions of the JD-R model, using a sample of Italian employees, while taking into consideration the limited number of similar studies (Balducci, Schaufeli, & Fraccaroli, 2011; Simbula, Guglielmi, & Schaufeli, 2010). In particular, we assume that job demands (i.e., workload) and job resources (i.e., autonomy, coworkers and supervisor support) differentially predict strain and work engagement, while personal resources (i.e., occupational self-efficacy) mediate the association between job resources and work engagement.

As already mentioned, the JD-R model assumed that job demands affect workers negatively, in particular workers’ wellbeing. Bakker and colleagues (2004) found a positive connection between such demands and job strain, explaining it using the health impairment process. Other significant connections were found between job demands and outcomes such as stress and health problems in many studies (e.g., Bakker et al., 2003). On the basis of the health impairment process, we assume that:

H1. Job demands (i.e., workload) will be positively associated with strain.

With regard to job resources, many studies showed their positive effect on work engagement (Hakanen et al., 2006; Schaufeli & Bakker, 2004). In their longitudinal study on a group of Finnish healthcare workers, Mauno, Kinnunen, and Ruokolainen (2007) showed that job resources were a more viable means of fostering work engagement than job demands. In a more recent longitudinal survey among Italian teachers, Simbula and colleagues (2010) found bi-directional
influences between job resources and work engagement. Job resources also proved to improve working conditions of unpaid workers; in particular, Lo Presti (2013) found, in a sample of Italian volunteers, strong positive associations between job resources on one hand, and organizational commitment, job satisfaction and intention to remain on the other. On the basis of the motivational process and the effort-recovery approach, we assume that:

H2. Job resources (i.e., autonomy, coworkers, and supervisory support) will be positively associated with work engagement.

Luthans and colleagues (2006) showed that a resourceful work environment can activate employees’ psychological capital, which in turn can lead to positive financial outcomes. Citing this evidence, Xanthopoulou and colleagues (2007) stated that these findings (see also Pierce & Gardner, 2004) suggested the existence of environment (job) resources that may activate personal resources and this, in turn, may result in positive psychological and organizational outcomes. On the basis of this evidence, we assume that:

H3. Personal resources (i.e., occupational self-efficacy) will mediate the relation between job resources and work engagement.

Finally, Xanthopoulou and colleagues (2007) and Lorente, Salanova, Martinez, and Schaufeli (2008) found negative connections between personal resources and exhaustion, which meant that being self-efficacious, optimist, and so on, may help to improve individual well-being; thus, we assume that:

H4. Personal resources (i.e., occupational self-efficacy) will be negatively associated with strain.

METHOD

Participants and Procedure

Seven hundred and fifty-one Italian employees working at different public and private organizations in Campania (N = 353) and Sardinia (N = 398) regions participated in the study through a convenience sampling procedure. Self-report questionnaires, accompanied by cover letters illustrating the study aims, were distributed along with sealable envelopes (to further guarantee privacy) within organizational contexts (which had previously agreed to allow data collection) and retrieved 1-2 weeks after by trained interviewers.

Of these, 389 were women (51.8%) and 362 were men (48.2%). For reasons of confidentiality required by some organizations, age was included as a categorical variable; in particular: 120 employees were 25 years old or younger (16%), 136 were between 26 and 30 years (18.1%), 104 between 31 and 35 years (13.8%), 107 between 36 and 40 years (14.2%) and 282 were 41 years old or older (37.5%) (two participants did not respond). The tenure mean was 9.85 years (SD = 9.27, min .01, max 39).

With regard to contract type, 499 employees had a permanent contract (66.4%), while the remaining 251 participants claimed to have another form of fixed-term employment (33.5%) (one did not respond). A significant number of permanent employees worked for public administrations (141), hospitals (144), and post offices (106), while temporary employees were mainly recruited across several manufacturing and service organizations.
Measures

Scales not already available in Italian were adapted through a process of back-translation and a subsequent pilot study (110 hospital workers) to test for their reliability.

Job Demands

Workload (Bakker et al., 2004): three items (“Do you have too much work to do?” “Do you have to work very fast?” “How often does it occur that you have to work extra hard to finish your work?”). Responses were based on a 5-point Likert scale (from 1 = never to 5 = always), and scores equal to the mean of the three items.

Job Resources

Work autonomy (Bakker et al., 2004): three items (e.g., “I can decide myself how I execute my work”). Responses were based on a 5-point Likert scale (from 1 = never to 5 = always), and scores equal to the mean of the three items.

Coworkers support: two items from Bakker et al., 2004, another item specifically developed (e.g., “Can you ask your colleagues for help if necessary?”). Responses were based on a 5-point Likert scale (from 1 = never to 5 = always), scores equal to the mean of the three items.

Supervisor support (Carlson, Kacmar, Holliday Wayne, & Grzywacz, 2006): three items (e.g., “My supervisor and I get along well”). Responses were based on a 5-point Likert scale (from 1 = never to 5 = always), scores equal to the mean of the three items.

Personal Resources

Occupational self-efficacy (Schyns & Collani, 2002; Italian adaption by Di Fabio & Taralla, 2006): eight items (e.g., “Thanks to my resourcefulness, I know how to handle unforeseen situations in my job”). Responses were based on a 6-point Likert scale (from 1 = completely false to 6 = completely true), scores equal to the sum of the eight items.

Outcome Variables

Work engagement, evaluated using the Utrecht Work Engagement Scale (nine items; Schaufeli, Bakker, & Salanova, 2006), and based on its traditional subdivision into three subscales: vigor (three items; e.g., “At work, I feel bursting with energy”), dedication (three items; e.g., “My job inspires me”), and absorption (three items; e.g., “Time flies when I’m working”). Responses were based on a 7-point Likert scale (from 0 = never to 6 = always), scores equal to the sum of the nine items (for each subscale equal to the sum of its items’ triad).
Strain, evaluated via the General Health Questionnaire — 12 items version (Goldberg, 1979; Italian adaptation by Piccinelli, Bisoffi, Bon, Cunico, & Tansella, 1993), employing the tripartition proposed by Cheung (2002): social dysfunction (six items; e.g., “Able to concentrate”), anxiety and depression (four items; e.g., “Lost sleep over worry”), and loss of confidence (two items; e.g., “Seeing oneself as worthless”). Responses were based on a 4-point Likert scale (from 0 = more than usual to 3 = much less than usual, for social dysfunction; from 0 = no to 3 = much more than usual, for the other two scales), scores equal to the sum of the 12 items (for each subscale equal to the sum of its respective items).

Data Analysis

Structural equation modeling analyses (Lisrel 8.8; Jöreskog & Sörbom, 1996) using Maximum Likelihood estimation methods (along with the indicators’ covariance matrix) were used to evaluate the measurement and structural models concerning study variables and their associations.

With regard to the measurement model, we relied on the item parceling technique (Bandolos, 2002; Little, Cunningham, Shahar, & Widaman, 2002), which allows parcel creation on the basis of the calculated mean between different items referring to the same construct. Advantages of this technique include fewer instability risks in the parameters’ estimates, fewer estimation problems deriving from the small number of cases, and fewer risks deriving from items’ non-normality or the excessive number of parameters to be estimated. Item parceling technique has already been applied in the examination of the JD-R model (e.g., Bakker et al., 2003).

Item parceling was used in the following cases: occupational self-efficacy (three parcels for eight items), autonomy, coworker and supervisory support (each operating on its scale score) considered as three facets of “job resources,” the three work engagement subscales, and the three GHQ-12 subscales — as indicators of their respective variables. Regarding workload, the three indicators coincided with the three scales’ items. Parcels’ descriptive statistics are depicted in Table 1.

With regard to the models’ goodness-of-fit evaluation, we relied on both absolute and relative goodness-of-fit indices. In addition to referring to the chi square and degrees of freedom to evaluate possible significant differences between alternative nested models, we reported the following indices: root mean square error of approximation (RMSEA; acceptable values lower than .08; Cudeck & Browne, 1993), standardized root mean square residual (SRMR; acceptable values lower than .08; Hu & Bentler, 1999), non-normed fit index (NNFI), comparative fit index (CFI), and incremental fit index (IFI), for which scores higher than .90 are acceptable (Hoyle, 1995; Marsh, Balla, & Hau, 1996).

RESULTS

Table 1 shows the zero-order correlation matrix between the study’s variables, their means and standard deviations.
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<td>(.16)</td>
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<td>(.19)</td>
<td>(.13)</td>
<td>(.17)</td>
<td>(.16)</td>
<td>(.15)</td>
<td>(.14)</td>
<td>(.18)</td>
<td>(.20)</td>
<td>(.20)</td>
<td>(.10)</td>
<td>(.85)</td>
<td>(.42)</td>
<td></td>
</tr>
<tr>
<td>19) Loss of confidence</td>
<td>1.16</td>
<td>1.65</td>
<td>(.06)</td>
<td>(.05)</td>
<td>(.04)</td>
<td>(.05)</td>
<td>(.19)</td>
<td>(.18)</td>
<td>(.16)</td>
<td>(.25)</td>
<td>(.22)</td>
<td>(.24)</td>
<td>(.20)</td>
<td>(.17)</td>
<td>(.18)</td>
<td>(.18)</td>
<td>(.10)</td>
<td>(.75)</td>
<td>(.43)</td>
<td>(.60)</td>
</tr>
</tbody>
</table>

Note. *p < .05. **p < .01.
First of all, we controlled for parcels’ normality; all kurtosis and skewness values were lower than ±1 except loss of confidence (kurtosis = 1.11, skewness = 1.42) and social dysfunction (kurtosis = 1.11); in any case, these values were below the ±1.96 cut-off as recommended by Schaufeli and colleagues (2006). Thus, a measurement model was developed in order to examine the construct validity of study measures using confirmatory factor analysis (CFA); a common method is to compare different models (nested models), from a one-factor model to a final one containing as many factors as included measures (in our case five latent variables), passing over intermediate solutions. The different models were compared on the basis of chi square/degrees of freedom scores, and on different goodness of fit indices.

Three different measurement models were developed: a single factor model, a two factor model (job resources, demands, and personal resources on one hand, and work engagement and strain on the other), and finally the model to be confirmed, containing five separate factors (Table 2).

<table>
<thead>
<tr>
<th>TABLE 2</th>
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<tr>
<td>Alternative measurement models on study variables, including goodness-of-fit indices</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>$\chi^2$</th>
<th>df</th>
<th>RMSEA</th>
<th>NNFI</th>
<th>CFI</th>
<th>IFI</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>model 1 – one factor</td>
<td>2928.91</td>
<td>90</td>
<td>.20</td>
<td>.54</td>
<td>.60</td>
<td>.61</td>
<td>.15</td>
</tr>
<tr>
<td>model 2 – two factors</td>
<td>1913.24</td>
<td>89</td>
<td>.16</td>
<td>.69</td>
<td>.74</td>
<td>.74</td>
<td>.14</td>
</tr>
<tr>
<td>model 3 – five factors</td>
<td>349.60</td>
<td>80</td>
<td>.07</td>
<td>.95</td>
<td>.96</td>
<td>.96</td>
<td>.05</td>
</tr>
</tbody>
</table>

There is a remarkable improvement from model 1 to model 3, proven by all the included indices. Such results supported a measurement model in which parcels referred to their respective latent variables making it possible to estimate the subsequent structural model.

The first structural model contained all hypothesized relationships, as well as an estimation parameter of the covariation between job resources and job demands (as previously reported, for instance, by Bakker et al., 2003), and between measurement errors of work engagement and strain (as previously reported, for instance, by Xanthopoulou et al., 2007).

The estimated model (M1) on the basis of our hypotheses showed acceptable goodness-of-fit indices, $\chi^2 = 389.63$, $df = 83$, $p < .01$; RMSEA = .070; NNFI = .94; CFI = .95; IFI = .95; SRMR = .068; as regards the statistical significance and direction of the relations between variables, they were all consistent with the hypotheses except for the link between occupational self-efficacy and work engagement, which was nonsignificant.

On the other hand, modification indices of M1 suggested that there was a direct link from job resources to strain. Subsequent goodness-of-fit indices of a structural model containing this additional parameter, $\chi^2 = 363.05$, $df = 82$, $p < .01$; RMSEA = .068; NNFI = .94; CFI = .96; IFI = .96; SRMR = .061 as well as the $\chi^2$ difference, $\Delta\chi^2(1) = 26.58$, $p < .001$, supported this option (M2), depicted in Figure 1.

Workload was positively associated with strain ($\gamma = .21$, $p < .01$) and positively covaried with job resources ($r = .14$, $p < .01$).
Job resources (which included work autonomy, coworker and supervisor support) were negatively associated with strain ($\gamma = -.35$, $p < .01$), and positively associated with occupational self-efficacy ($\gamma = .50$, $p < .01$) and work engagement ($\gamma = .66$, $p < .01$).

Occupational self-efficacy proved to be associated with strain ($\beta = -.15$, $p < .01$) but not with work engagement ($\beta = -.06$, $ns$).

Finally, the covariation of measurement errors between strain and work engagement resulted not statistically significant ($-.02$, $ns$).

In regards to variance, the relationships between variables explained 49% of work engagement variance, 21% of strain variance, and 25% of occupational self-efficacy variance.  

**DISCUSSION OF RESULTS**

Consistent with Bakker and colleagues (2003, 2004), Hypothesis 1 postulated that workload could be positively associated with strain. Evidence obtained through structural equation modeling allows to accept such hypothesis inasmuch as a higher workload was associated with greater strain. It appears necessary to stress that the magnitude of this association was weaker...
than that found by Bakker and colleagues in 2003 and 2004, and by Xanthopoulou and colleagues in 2007, probably because part of the strain variance can be explained by job resources.

Hypothesis 2 postulated that job resources could be positively associated with work engagement. In fact, on the basis of the so-called motivational process (Bakker, 2009), such positive job aspects could heighten individual motivation, and subsequently encourage work engagement. The emerged link permits acceptance of such a hypothesis. Similar results were obtained by Xanthopoulou and colleagues in 2007; Bakker and colleagues in 2003 found a similar link between job resources and job involvement, while in 2004, Bakker and colleagues found a strong negative association between such resources and disengagement.

Hypothesis 3 postulated that occupational self-efficacy could mediate the relations between job resources and work engagement. Any mediation effect should be excluded, inasmuch as occupational self-efficacy was indeed positively associated with job resources, but not with work engagement. Thus, it is possible to state that, while the availability of higher job resources in terms of autonomy, support, and so forth, encouraged a significant increase in self-efficacy, it did not outwardly influence work engagement (the latter, as already mentioned, was strongly influenced by job resources). Then, Hypothesis 3 cannot be accepted, since a relation between job resources and occupational self-efficacy was only supported, lacking a significant link between this latter and work engagement.

Hypothesis 4 postulated that occupational self-efficacy could be negatively associated with strain, as consistently found by Xanthopoulou and colleagues (2007) and Lorente and colleagues (2008). The found link was statistically significant although weak, thus such hypothesis is supported. Thus, it is possible to state that feeling competent and efficacious at work can contribute to increasing individual levels of wellbeing.

Finally, it is worth noting that the relationship between workload and job resources, although statistically significant, contradicted the findings of Xanthopoulou and colleagues (2007) and Bakker and colleagues (2003) which found a negative association. This could be due to a perception of the workload as challenging rather than excessively burdensome, resulting, in the end, in a partial positive covariation with job resources.

CONCLUSIONS

This study aimed to provide additional data supporting the validity of the Job Demands-Resources model on a sample of Italian employees, testing its main postulated links between job resources/demands and personal resources on one hand, and work engagement and strain on the other. Results were similar but not identical to other studies already carried out in our country (Balducci et al., 2011; Simbula et al., 2010).

A workplace with heavier workload had a higher probability of straining employees and, plausibly, creating more serious health problems in the medium and long term. Additionally, as regards correlations, workload was positively associated with occupational self-efficacy and work engagement; it means that, besides being a stressor, it goes along with workers feeling more competent and engaged in their work activities.

With regard to some of the features commonly considered to be positive in any workplace — autonomy, the possibility to rely on the support and help of one’s colleagues and super-
visors — we observed how they contributed to decreasing the perception of strain and, at the same time, to increasing occupational self-efficacy and work engagement.

With respect to previous literature (Pierce & Gardner, 2004; Xanthopoulou et al., 2007) and to its potential role of mediator, occupational self-efficacy, as a personal resource, did not affect work engagement, while it was mainly predicted by job resources. At the same time, it was negatively associated with strain, meaning that feeling competent at work can slightly contribute to decreasing strain levels.

From a practical point of view, the most important result of our study concerns the direct relations between job demands and resources on the one hand, and strain and engagement on the other. Designing and/or ensuring jobs that are characterized by autonomy, a reasonable workload, and the possibility of relying on different forms of social support, can contribute to decreasing the levels of strain and significantly increase the levels of engagement and occupational self-efficacy.

As far as the limitations of this study are concerned, it is first necessary to address the potential problems stemming from the common method variance. Secondly, given that it was a cross-sectional survey, it was, predictably, unable to infer cause-effect relations. Finally, the potential nonrepresentativeness of the present sample may have limited the external validity of our results.

NOTES

1. For the sake of exploration, we tested for the moderating effects personal and job resources have on the relationship between workload and strain according to Bakker and Demerouti (2007). We adopted the moderated structural equation modeling (MSEM) procedure by Mathieu, Tannenbaum, and Salas (1992) described in Cortina, Chen, and Dunlap (2001). All the tested interactions resulted nonsignificant.

2. On the other hand, a positive significant correlation exists between self-efficacy and engagement. More detailed analyses on the correlation matrix showed two cases of partial redundancy between occupational self-efficacy, and coworker and supervisor support. Such statistical phenomena occur when a predictor’s β decrease is caused by the fact that another predictor is the vector of part of the same information with respect to a common outcome. From a statistical point of view, it occurs when $r_{Y1} > r_{Y2}$ $r_{12} > r_{Y1} > r_{12}$. Where 1 and 2 are predictors and Y is the outcome (Cohen, Cohen, West, & Aiken, 2003).

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