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Personality type matters: Perceptions of job demands, job resources, and their associations with work engagement and mental health

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Abstract

This three-wave study examined whether the pattern of associations of job demands and job resources with work engagement and mental health depends on personality types. In a representative sample of the German workforce ($N = 13,665$), the Big Five personality traits could be used to cluster participants into five personality types: ordinary, resilient, strained, overcontrolled, and undercontrolled. As predicted, job demands were associated with mental health and job resources were primarily associated with work engagement. However, these relationships differed across personality types. We conclude that research and practice could take a more personality-driven stance towards employee perceptions of job demands and job resources and their associations with work engagement and mental health.

Keywords Personality types · Job demands · Job resources · Work engagement · Mental health

Introduction

Healthy and motivated employees are essential for the productivity and success of a company and for reducing financial burden on the health care system and society. Consequently, research and practice aim to define and create healthy and motivating work environments in which employees get what they need to thrive in their work. To date, researchers and practitioners have been particularly focused on defining characteristics of the work environment that are beneficial (or detrimental) to all employees. Indeed, employees are well-suited for and perform best in their work if it fulfils basic human needs, such as the need for autonomy, competence, and relatedness (Deci & Ryan, 2000). In addition to these basic needs, employees also have unique needs related to their personality and values (Van Vianen, Hamstra, & Koen, 2016). Person-Environment fit theory (Van Vianen, 2018) proposes that people have an innate need to fit environments that match their own characteristics. A

specific work environment can be thriving for one employee and oppressing for another, depending on an employee's personality. More research is needed that accounts for personality differences in predicting which environments are motivating and healthy for employees. This research can extend existing theory and prior empirical findings and can inform practice of how to establish an optimal match between individual employees and work characteristics.

The job demands-resources (JD-R) model categorizes work-related characteristics into job demands and resources to predict work engagement and mental health (cf. Crawford, Lepine, & Rich, 2010; Nahrgang, Morgeson, & Hofmann, 2011). The JD-R model specifies that job demands relate to mental health (named the health impairment process), while job resources relate especially to work engagement (named the motivational process) (Bakker & Demerouti, 2017). According to the JD-R model, the health impairment process follows two paths. In the first path, high job demands provoke prolonged overtaxing, resulting in exhaustion. In the second path, a lack of resources hampers attempts to meet job demands, which in the long run leads to disengagement and withdrawal (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001).

Personality traits are proposed to impact the associations between the independent (job demands and resources) and dependent variables (mental health and work engagement) of the JD-R model. Bakker, Demerouti, and Sanz-Vergel (2014, p. 394), for example, noted that "(p)ersonality may play an important role in work engagement (...), because individuals with a

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specific personality profile may be better able to mobilize their job resources than individuals with a different profile are. For example, extraverts show positive emotions, a high frequency and intensity of personal interactions, and a high need for stimulation". Thus, some personality traits might exacerbate the association of job demands and resources with job outcomes, respectively, while others might alleviate it.

Personality theory distinguishes five basic personality traits, neuroticism, extraversion, openness, agreeableness, and conscientiousness, which are called the Big Five or the Five-Factor Model (FFM) of personality (John, Naumann, & Soto, 2008). Traditionally, these personality types have been considered in isolation, but recently personality researchers have combined the Big Five personality traits into personality (proto)types or profiles (Asendorpf, Borkenau, Ostendorf, & Van Aken, 2001; Gerlach, Farb, Revelle, & Amaral, 2018; Herzberg & Roth, 2006), each consisting of a specific combination of Big Five traits. The reduction of a large number of combinations of single personality traits into a few personality types provides advantages for research and practice. This person-centered approach examines individuals as a whole, which makes it possible to understand how individuals rather than their individual traits interact with the environment (Fisher & Robie, 2019). Mounting empirical evidence has confirmed the existence of personality types (Gerlach et al., 2018; Isler, Fletcher, Liu, & Sibley, 2017; Roth & von Collani, 2007). Moreover, personality types were found to relate differently to health outcomes (Kinnunen et al., 2012).

In this study, we integrate recent developments in personality research – the existence of personality types – into the well-established JD-R model. As knowledge about the role of personality in the JD-R model is still lacking, we explore (1) differences in job demands, job resources, work engagement, and mental health across personality types and (2) the associations of job demands and resources with work engagement and mental health across personality types.

This study contributes to the literature on personality types and the JD-R model in three ways. First, this study provides a differentiated, broadened, and deepened understanding of personality differences in employee perceptions of the work environment. Second, this study examines whether job demands and job resources relate differently to work engagement and mental health, depending on an employee's personality type. Third, the findings of this study may challenge the current "one size fits all approach" in research and practice and can inform practice on tailored work engagement and health promoting interventions.

The Job Demands-Resources Model

The job demands-resources (JD-R) model (Demerouti et al., 2001) is one of the best-established frameworks describing the

association between work characteristics and mental health and work engagement. The heart of this model is the idea that factors contributing to stress, mental health, and work engagement can be classified into two categories: job demands and job resources (Bakker & Demerouti, 2017; Demerouti et al., 2001). Job demands are physical, social, or organizational job aspects that are mentally or physically demanding and are therefore accompanied by physiological and psychological expenditures (Bakker, Demerouti, & Euwema, 2005). In contrast, job resources are physical, social, or organizational job aspects that are beneficial in buffering the link between job demands and the related physiological and psychological expenditures. In addition, job resources facilitate achievement of work aims, motivate personal development and growth, and promote work engagement (Bakker et al., 2005). Two processes translate work characteristics into negative work outcomes such as mental exhaustion and disengagement, respectively. The health impairment process refers to high demands, which deplete mental and physical resources leading to exhaustion and ill-health. The motivational impairment process is characterized by low resources, which impairs work engagement (Bakker & Demerouti, 2008; Bakker, Demerouti, & Schaufeli, 2003). The JD-R model proposes that demands are especially related to mental health, while resources are especially related to work engagement. An additional proposition of the model is that job resources reduce the negative association between job demands and mental health (Bakker et al., 2005). This model has received extensive empirical support and has been generalized to different work populations (for an overview see Bakker & Demerouti, 2017).

Personality Traits and Types, and Occupational Health

Individual personality traits can determine how individuals perceive and interpret their (work) environment, handle stress, and subsequently how mentally healthy they are (c.f., Ozer & Benet-Martinez, 2006). Moreover, individual personality traits affect how individuals experience their work characteristics: whether they are experienced as demands or as resources (Mäkikangas, Feldt, Kinnunen, & Mauno, 2013).

The best-established model to describe personality is the Big Five model, also called the Five-Factor Model (FFM) (Goldberg, 1990; Matthews, Deary, & Whiteman, 2003; McCrae & Costa Jr, 2008). This model distinguishes five personality traits: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. Neuroticism is characterized by trait adjectives such as: tense, anxious, nervous, moody, and worrying. Extraversion encompasses trait adjectives such as talkative, assertive, active, energetic, and outgoing. Openness to experience includes trait adjectives such as wide interests, imaginative, intelligent, and original.

Agreeableness refers to trait adjectives such as sympathetic, kind, appreciative, affectionate, and soft-hearted. Conscientiousness concerns trait adjectives such as organized, thorough, planful, and efficient (John et al., 2008).

These traits are linked to job performance, well-being, and health (e.g., Albrecht & Marty, 2020; Bakker, Van Der Zee, Lewig, & Dollard, 2006; Barrick & Mount, 1991; Goodwin & Friedman, 2006; Timothy A Judge, Higgins, Thoresen, & Barrick, 1999; Taris & Schaufeli, 2016). Especially the trait neuroticism has been identified to have negative effects on health and engagement (Inceoglu & Warr, 2011; H. J. Kim, Shin, & Swanger, 2009). People high on this trait are characterized by a relatively stable tendency to react to frustration, threat, or loss with negative emotions (Lahey, 2009). Hence, neuroticism is expected to relate to the affective and motivational components of engagement (Inceoglu & Warr, 2011). Additionally, Bakker et al. (2006) found that neuroticism was related to burnout. Also, conscientiousness and extraversion have been linked to work engagement (Inceoglu & Warr, 2011; H. J. Kim et al., 2009). However, based on the Conservation of Resources theory (Hobfoll, 1989) that asserts reciprocal associations between resources and outcomes, and a review of longitudinal studies, Mäkikangas et al. (2013) conclude that personality and work engagement are reciprocally related and are likely to accumulate.

The Big Five model characterizes individuals according to five isolated traits, reflecting a *variable-centered approach* to personality. However, other personality researchers characterize individuals according to typical combinations of these traits, which reflect a typology or person-centered approach to personality. They use cluster analytic methods to determine valid personality types. The so-called ARC model – named after authors of the studies underlying this model Asendorpf et al. (2001), Robins, John, Caspi, Moffitt, and Stouthamer-Loeber (1996); Caspi and Silva (1995) (c.f., Gerlach et al., 2018) – differentiates three personality types: resilient, overcontrolled, and undercontrolled. Resilient individuals are typically low on neuroticism and high on extraversion, agreeableness, and conscientiousness, and have medium or slightly increased values in openness to experience. Overcontrolled individuals are characterized by low extraversion and high neuroticism. Undercontrolled individuals have low values particularly on agreeableness and conscientiousness.

Based on a literature review and empirical investigation, Herzberg and Roth (2006) extended the ARC model with the personality types confident and reserved. Confident individuals have medium values on neuroticism, agreeableness and conscientiousness and moderately high values on extraversion and openness. This personality type resembles the personality type identified by other authors, who labelled it as assertive or resilient undercontrolled (Gramzow et al., 2004; Schnabel, Asendorpf, & Ostendorf, 2002). Reserved individuals are characterised by low neuroticism, extraversion and

openness and moderately high values on agreeableness and conscientiousness. The resilient type is similar to the resilient overcontrolled or the well adjusted type in other examinations (Gramzow et al., 2004; Schnabel et al., 2002). Recently, Gerlach et al. (2018) found evidence for four distinct personality types by applying an alternate computational clustering approach to data from more than 1.5 million people. They redefine the ARC-types into role model, self-centred, and reserved, and extend this typology by the average personality type, characterised by average values on all traits. Taken together, although there is no final consensus about the number and description of the personality types, the different models do share some basic characteristics of personality types. Additional research with different samples can further confirm or uncover the existence of specific personality types.

Kinnunen et al. (2012) who were among the first to investigate the relation between personality types and health concluded that the personality type approach revealed more nuanced associations with health than the variable-centered approach. Their study among Finnish adults identified five personality types: resilient (neuroticism low, other traits high), overcontrolled (neuroticism high, other traits low), reserved (conscientiousness high, low on other traits), undercontrolled (openness and extraversion high, conscientiousness low), and ordinary (average on all traits) (Kinnunen et al., 2012). These personality types were stable over time (measured at age 33, 42 and 50) and they were differently related to subjective health (psychological distress, self-rated health, and symptoms reporting). Resilient individuals reported the best and overcontrolled stated the worst health over eight years.

The present study examines the combination of personality traits into personality types. Furthermore it extends prior research (Kinnunen et al., 2012) by relating personality types to both work engagement and mental health and by taking personality type into account when analyzing the association between employees' experienced work environment and their work engagement and mental health.

The Present Study

The present study aims to identify personality types based on the Big Five traits in a representative sample of employees in German companies with more than 50 employees (Bellmann et al., 2015; Kampkötter, Mohrenweiser, Sliwka, Steffes, & Wolter, 2016). The perception of the work characteristics and work engagement, as well as mental health across the personality types are examined. In addition, the relation of job demands and job resources with work engagement and mental health are examined separately for each personality type in three consecutive waves. Based on the literature discussed above, the development of confirmatory hypotheses does not appear advisable and we therefore formulated explorative

research questions. If the previous findings on personality types are generally valid, it should also be possible to replicate the types in this (occupational) sample. Our research question is:

Research question 1: Can the Big Five personality traits be clustered into specific personality types?

Previous research has shown that personality traits are related to perceptions of job demands and resources, well-being and work engagement (Bakker et al., 2010; Janssens, De Zutter, Geens, Vogt, & Braeckman, 2019; Weiss, Bates, & Luciano, 2008; Wilmot, Wanberg, Kammeyer-Mueller, & Ones, 2019). Based on these findings, we assume a relationship between personality types and these work-related perceptions. Our second research question is:

Research question 2. Do perceptions of job demands and resources, and work engagement and mental health differ for specific personality types?

Personality types were found to be differently related to subjective health (Kinnunen et al., 2012). This might be due to differences in perceptions of work characteristics (job demands and resources), as we suggest above. For example, a specific personality type may experience more job demands and fewer resources than other personality types in similar work conditions, leading to lower subjective health. However, it is also possible that personality types differ in the extent to which perceptions of work characteristics are related to mental health and work engagement. For example, employees may experience a similar high amount of work pressure but this may impact the health outcomes of a specific personality type more than those of other personality types. Our third research question is:

Research question 3. Do the associations of job demands and job resources with work engagement and mental health differ for specific personality types?

Methods

Participants and Procedure

In this study, three waves from the Linked Personnel Panel (LPP) were used. The LPP is a longitudinal survey, which is representative for companies from the private sector in Germany that have more than 50 employees (Kampkötter et al., 2016). The sample was drawn from the Institute for Employment Research Establishment Panel, an annual representative survey of around 16,000 German companies

representing all industries and sizes nationwide (Bellmann et al., 2015; Fischer, Janik, Müller, & Schmucker, 2009). Companies with less than 50 employees and from the business sectors of agriculture, forestry and fishery, as well as civil service and charity organisations were excluded. The sample was stratified according to sector, size and region (Bellmann et al., 2015; Kampkötter et al., 2016).

The first wave was conducted in 2012/2013 among 7508 employees. The second wave was in 2014/2015 among 7282 employees and the last wave was in 2016/2017, collecting data of 6779 employees. In total, 13,999 employees (71.2% men, with an average age of 45.53 (SD = 10.78), ranging from 18 to 74 years; 61.8% white-collar; 87.2% work full time) participated in one or more waves and 13,665 employees were available for identifying personality types by means of cluster analysis. Of these, 4207 employees (73.1% men, with an average age of 46.19 (SD = 9.55), ranging from 20 to 63 years; 64.2% white-collar; 88.2% full time) were eligible for longitudinal analyses across three waves. All participants gave informed consent, and the Ethics Commission of the Medical Faculty Mannheim of the University of Heidelberg (2018-514N-MA) approved the secondary data analysis.

Measurements

The measurements concerned work characteristics, personality traits, work engagement and mental health. Personality traits were assessed at baseline whereas the other variables were measured at each wave. All scales, except mental health, were measured on a five-point Likert scale of which most ranged from “does not apply at all” (1) to “applies completely” (5).

Work Characteristics The Job Demands-Resources Model specifies work characteristics in terms of job demands and job resources (e.g., Demerouti et al., 2001). The items for measuring job demands and job resources were chosen based on theoretical reasoning and statistical exploration (i.e., exploratory factor analysis using a maximum likelihood estimation with varimax rotation, see the Appendix Table 5). *Job demands* concerned physical demands and work-home interference. Physical demands comprised two items (job requires physical effort, and to be exposed to unpleasant conditions, Cronbach’s alpha = .69) (Morgeson & Humphrey, 2006). Work-home interference was assessed with five items (e.g., having time pressure, or work demands interfere with home and family life, Cronbach’s alpha = .76) (Morgeson & Humphrey, 2006; Netemeyer, Boles, & McMurrian, 1996). Job resources were operationalized as work autonomy and variety, fairness at work, leadership and company culture, development opportunities, and peer support. Work autonomy and variety are two core job characteristics of Hackman and Oldham’s Job Characteristics Model

(Hackman & Oldham, 1976). We combined the two items reflecting these job characteristics (“job allows to make own decisions” and “job involves a great deal of task variety”; Morgeson & Humphrey, 2006) into a composite scale, work autonomy and variety. The Cronbach’s alpha of this scale was .47. Fairness at work included three items (e.g., being rewarded fairly at work, or rules and procedures to make decisions are fair, Cronbach’s alpha = .65) (Kim & Leung, 2007). Leadership and company culture were assessed with seven items (e.g., “supervisors have confidence in those they manage” and “all are aware of the long-term plans and direction of the company”, Cronbach’s alpha = .84). Development opportunities were assessed with three items (e.g., “the company is interested in development of professional knowledge and competences”, Cronbach’s alpha = .74). Finally, peer support was measured by two items (“receiving help and support from colleagues if required” and “offering help to colleagues”, Cronbach’s alpha = .68). For all scales, mean scores were calculated and higher values indicate higher perceptions on the respective dimensions.

Personality Traits Big Five personality traits (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) were measured at the first wave with 16 items from the Big Five Inventory short scale (BFI-S) (Gerlitz & Schupp, 2005). Neuroticism (Cronbach’s alpha = .56), extraversion (Cronbach’s alpha = .60), agreeableness (Cronbach’s alpha = .42), and conscientiousness (Cronbach’s alpha = .54) were measured with three items, openness to experience (Cronbach’s alpha = .54) with four items. The low internal consistencies are comparable to those of the initial study in which the scales were developed (neuroticism = .61, extraversion = .69, agreeableness = .53, conscientiousness = .59, openness to experience = .65 (Richter, Metzger, Weinhardt, & Schupp, 2013)). Note that short personality scales generally have low alpha values (Kampkötter et al., 2016; Lang, John, Lüdtke, Schupp, & Wagner, 2011). The first reason is that the Cronbach’s alpha value is dependent of the number of items with shorter scales having lower values. The second reason is that Cronbach’s alpha values decreases with the heterogeneity of the items. Broad personality dimensions are composite measures including various items representing the construct. Despite the lower alpha values of short personality scales, these scales have shown the expected relationships with pertinent measurements (Gosling, Rentfrow, & Swann, 2003; Kampkötter et al., 2016). Mean values were calculated with higher values indicating a higher personality trait characteristic.

Work Engagement Work engagement was measured by nine items taken from the Utrecht Work Engagement Short Scale (UWES-9) (Schaufeli & Bakker, 2004a, 2004b). The dimensions vigour (e.g., “At my work, I feel bursting with energy”),

dedication (e.g., “I am enthusiastic about my job”), and absorption (e.g., “I get carried away when I’m working”) were measured with three items each. All items were rated on a five-point Likert scale, asking how often employees feel or experience the respective statement: (1) every day, (2) several times a week, (3) several times a month, (4) a few times a year, (5) never. Ratings were reversed and a mean score was calculated with higher scores representing more work engagement. Cronbach’s alpha for the scale was .91.

Mental Health Mental health was assessed by the 1998 version of WHO-5-Well-Being Questionnaire (Topp, Østergaard, Søndergaard, & Bech, 2015). Participants rated five items how they felt the last two weeks on a six-point scale (from 0 “at no time” to 5 “all of the time”): cheerful and in good spirits; calm and relaxed; active and vigorous; woke up feeling fresh and rested; daily life has been filled with things that interest me. Cronbach’s alpha for the scale was .84. In line with Topp et al. (2015), the items were summed and multiplied by four to obtain values in the range from 0 to 100, where higher values are indicative for better mental health.

Statistical Analyses

The personality types were identified by an established clustering procedure (Asendorpf et al., 2001; Barbaranelli, 2002; Rammstedt, Riemann, Angleitner, & Borkenau, 2004; Sârbescu & Boncu, 2018). Personality scales were transformed by z- standardization and Ward’s hierarchical clustering was combined with non-hierarchical K-means clustering to avoid potential suboptimal solutions of hierarchical models (Asendorpf et al., 2001). The results from the Ward’s hierarchical clustering were used as the cluster centers for non-hierarchical k-means clustering (Asendorpf et al., 2001; Barbaranelli, 2002; Rammstedt et al., 2004; Sârbescu & Boncu, 2018).

The number of clusters was determined by the two-step approach as recommended by Herzberg and Roth (2006). In the first step, the cluster solutions at least moderately replicable were selected (Cohn’s $K \geq 0.6$ (Asendorpf et al., 2001)). In the second step, internal fit measures were applied (Duda and Hart’s stopping rule) (Duda, Hart, & Stork, 2001).

For each identified personality type, separate fixed-effect regression analyses were conducted, estimating the association of work characteristics (job demands and job resources) with work engagement and mental health across the three waves. These panel data regressions allow estimating the covariation of the independent (work characteristics) and dependent (work engagement and mental health) variables (Allison, 2009; Herr, Bosch, Theorell, & Loerbroks, 2018). Utilizing within-person variation inherently eliminates time-invariant factors from the analysis (Allison, 2009; Herr et al., 2018; Wooldridge, 2010). All time stable variables (e.g., gender,

working branch, or genetic set up) which were not measured (i.e., omitted variables) are thus eliminated because each individual is used as its own control (Allison, 2009; Herr, Almer, et al., 2018; Herr, Bosch, et al., 2018). Regressions based on z-standardized variables were adjusted for age (in years) to take into account the career stage in which individuals were, which can influence their perception of the psychosocial work environment (e.g., Loerbroks et al., 2010). The statistical analyses were performed using the software package Stata version 14 (S.E.).

Results

Table 1 presents the descriptive statistics and bivariate correlations of studied variables in the total sample. As expected, job demands were negatively and job resources were positively associated with work engagement and mental health. Personality traits were related to job demands, job resources, and outcomes, but in varying degrees and directions.

Personality Types

A five-cluster solution nearly reached the acceptable agreement of Cohn's $K = 0.60$ (Cohn's $K = 0.583$; adjusted Rand Index = 0.358) (Asendorpf et al., 2001; Herzberg & Roth, 2006). The Duda and Hart stopping rule index ($Je[2]/Je[1]$) was 0.86 (pseudo T squared = 992.84) for this solution. The second best solution had three clusters (Cohn's $K = 0.557$, adjusted Rand Index = 0.357) with a Duda and Hart stopping rule index of 0.78 (pseudo T squared = 1093.40).

The clusters of the preferable five-cluster solution appear theoretically sound and were retrieved in prior studies. The pattern of the mean z-scores of this solution is presented in Fig. 1. In the first cluster ($N = 3658$; 27%), participants had low neuroticism and average values on the other personality traits. This type is similar to the ordinary personality type of Kinnunen et al. (2012). The second cluster ($N = 2823$; 21%) has low neuroticism values and values above-average on the other traits. This type represents the resilient ARC personality type. The third cluster ($N = 2237$; 16%) has very low agreeableness values, while all other traits are above average. This type reflects the strained personality type (Sava & Popa, 2011). The last two clusters correspond to the ARC personality types overcontrolled ($N = 2313$; 17%) and undercontrolled ($N = 2634$; 19%). The overcontrolled personality type is characterized by low values in extraversion and high values in neuroticism, and the undercontrolled personality type has relatively high values on neuroticism and low values on agreeableness and openness and very low values on conscientious and extraversion (Rammstedt et al., 2004). Taken together, these results answer the first research question that the Big Five personality traits can be clustered into specific personality types.

Differences between Personality Types

Across the personality types, slight differences in age were observed ($F_{(4, 4206)} = 2.43$, $p = .046$). Individuals in the overcontrolled personality type cluster were on average the oldest, and individuals in the strained personality type cluster the youngest (mean ages were 46.96 (SD = 9.38) and 45.39 (SD = 9.97), respectively). Also, there were gender differences in the distribution of personality types ($X^2 = 55.60$, $p < .001$). Most males were ordinary (31.0%), followed by undercontrolled (21.0%), resilient (18.9%), strained (14.6%) and overcontrolled (14.5%). Most women were overcontrolled (21.7%), closely followed by ordinary (25.4%), resilient (19.4%), strained (18.2%) and undercontrolled (15.3%).

Significant differences in job demands, job resources, work engagement, and mental health were found across the personality types (Table 2), which answer our second research question. The strained personality type experienced the highest job demands, whereas the resilient personality type reported to have most job resources. The undercontrolled personality type experienced lowest job resources. Highest work engagement was reported by the resilient personality type and lowest work engagement was reported by the undercontrolled personality type. The strained personality type reported the second highest work engagement, before the ordinary and overcontrolled personality types, who had very similar ratings. Regarding mental health, the resilient personality type reported the highest values, followed by the ordinary, strained and the overcontrolled type. The undercontrolled type reported the lowest mental health.

The longitudinal associations of job demands and job resources with work engagement and mental health were generally in line with JD-R theory: resources were primarily related to work engagement (Table 3), whereas job demands were associated with mental health (Table 4). However, the strength of these associations was different across personality types, answering the third research question. Both job demands were significantly related to work engagement for the ordinary personality type; that is, an increase in physical demands and work-home interference was associated with reduced work engagement ($ey/dx = -0.073$, $p = .014$ and $ey/dx = -0.050$, $p = .027$, respectively). An increase in physical demands was also related to reduced work engagement for the strained and overcontrolled personality types ($ey/dx = -0.087$, $p = 0.041$ and $ey/dx = -0.091$, $p = .021$, respectively), whereas an increase in work-home interference was associated with reduced work engagement for the undercontrolled personality type ($ey/dx = -0.099$, $p = .001$). None of the demands were associated with work engagement for the resilient personality type.

With only a few exceptions, resources were positively associated with work engagement. For the ordinary personality type, all resources were related with work engagement, with

Table 1 Means, standard deviations, and correlations among study variables^a

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Sex	0.29	0.45																	
2 Age ^b	45.52	10.78	.02*																
3 Blue / white-collar ^c	1.62	0.49	.19**	-.07**															
4 Full / part time ^d	1.13	0.33	.48**	.07**	.13**														
5 Neuroticism	2.72	0.78	.14**	-.01	-.04**	.08**													
6 Extraversion	3.70	0.73	.04**	-.09**	.04**	.01	-.18**												
7 Openness	3.70	0.64	.02*	.01	.06**	-.02	-.02*	.33**											
8 Agreeableness	4.07	0.58	.09**	.01	.00	.07**	-.13**	.09**	.15**										
9 Conscientiousness	4.37	0.49	.10**	.06**	-.06**	.03**	-.08**	.26**	.24**	.29**									
10 Physical demands	2.91	0.86	-.10**	.00	.14**	-.10**	.17**	.01	.07**	-.12**	-.03**								
11 Work-home interference	2.58	1.33	-.09**	-.05**	-.51**	-.06**	.12**	-.02*	-.01	-.01	.10**	.10**							
12 Work autonomy and variety	4.11	0.81	-.06**	.02*	.15**	-.08**	-.12**	.16**	.18**	.06**	.12**	.09**	-.13**						
13 Fairness	3.64	0.81	-.05**	.04**	.07**	-.01	-.17**	.07**	.04**	.13**	.07**	-.26**	-.21**	.19**					
14 Leadership and company culture	3.75	0.75	.02*	.00	.00	.03**	-.13**	.13**	.11**	.19**	.16**	-.24**	-.07**	.21**	.56**				
15 Development opportunities	3.47	1.01	-.05**	-.01	.15**	-.04**	-.11**	.08**	.09**	.07**	.02*	-.08**	-.23**	.26**	.48**	.51**			
16 Peer support	4.28	0.72	-.01	-.06**	.02*	-.02*	-.10**	.13**	.11**	.12**	.08**	-.11**	-.09**	.14**	.22**	.22**	.19**		
17 Work engagement	3.75	0.81	.00	.08**	.05**	-.02*	-.14**	.19**	.23**	.16**	.27**	-.10**	-.10**	.33**	.35**	.39**	.33**	.22**	
18 Mental health ^e	62.66	20.41	-.07**	.04**	.04**	-.04**	-.30**	.17**	.15**	.12**	.12**	-.19**	-.11**	.16**	.26**	.25**	.22**	.15**	.39**

^a N varies from 13,446 to 13,999. ^b scores ranged from 18 to 74. ^c 1 = blue-collar 2 = white-collar. ^d 1 = full-time 2 = part time. ^e scores ranged from 0 to 100
 ***p* < .001; * *p* < .05

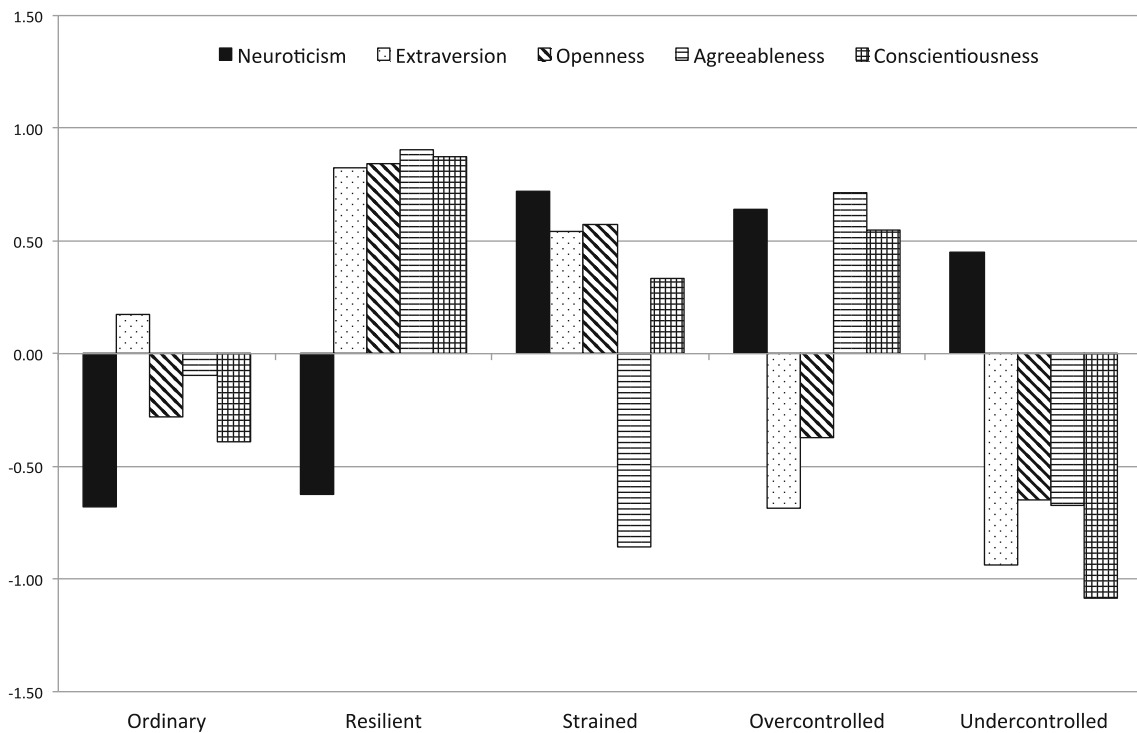


Fig. 1 Five personality types by the big-five z-scores

the strongest association for leadership and company culture ($ey/dx = 0.110, p < 0.001$), and fairness ($ey/dx = 0.101, p < .001$). For the resilient personality type, leadership and company culture, as well as development opportunities were not associated with work engagement, whereas the other resources were, with the strongest association for fairness ($ey/dx = 0.150, p < .001$). For the strained and the overcontrolled personality types, all resources were associated with work engagement and for the undercontrolled personality type only peer support showed no relationship with work engagement.

Regarding mental health, an increase in physical demands was associated with reduced mental health for the ordinary personality type ($ey/dx = -0.112, p = .006$), and the undercontrolled personality type ($ey/dx = -0.117, p = .041$). Except for the resilient personality type, an increase in work-home interference was associated with reduced mental health.

As already mentioned, associations between resources and mental health were limited. However, work autonomy and variety as well as fairness were positively associated with

Table 2 Differences in job demands, job resources, work engagement, and mental health, across personality types

	Ordinary (n=1240)		Resilient (n=800)		Strained (n=656)		Overcontrolled (n=693)		Undercontrolled (n=818)		Test for differences	
	M	SD	M	SD	M	SD	M	SD	M	SD	F-value	p
Job Demands												
Physical demands	2.29	1.23	2.41	1.37	2.65	1.40	2.62	1.37	2.46	1.22	11.23	<.001
Work-home interference	2.47	0.76	2.43	0.88	2.73	0.84	2.55	0.87	2.60	0.79	15.73	<.001
Job Resources												
Work autonomy and variety	4.17	0.70	4.42	0.70	4.27	0.74	4.04	0.81	3.94	0.74	50.18	<.001
Fairness	3.73	0.70	3.91	0.81	3.58	0.80	3.62	0.82	3.53	0.67	31.57	<.001
Leadership and company culture	3.72	0.64	4.03	0.73	3.71	0.77	3.72	0.77	3.48	0.64	62.4	<.001
Development opportunities	3.59	0.86	3.80	0.97	3.46	1.03	3.40	1.06	3.40	0.88	24.91	<.001
Peer support	4.32	0.64	4.52	0.62	4.30	0.69	4.29	0.72	4.13	0.67	34.06	<.001
Work engagement	3.74	0.72	4.18	0.69	3.87	0.71	3.71	0.82	3.36	0.76	128.89	<.001
Mental health	66.09	16.31	71.77	19.06	61.32	20.60	58.75	19.88	56.33	18.40	89.77	<.001

N = 4207

Table 3 Associations of job demands and job resources with work engagement across personality types

Work engagement	Ordinary (obs. = 2896, n=1240)			Resilient (obs. = 1824, n=800)			Strained (obs. = 1493, n=656)			Overcontrolled (obs. = 1572, n=693)			Undercontrolled (obs. = 1905, n=818)		
	<i>ey/dx</i>	<i>SE</i>	<i>p</i>	<i>ey/dx</i>	<i>SE</i>	<i>p</i>	<i>ey/dx</i>	<i>SE</i>	<i>p</i>	<i>ey/dx</i>	<i>SE</i>	<i>p</i>	<i>ey/dx</i>	<i>SE</i>	<i>p</i>
Job Demands															
Physical demands	-0.073	0.030	.014	0.019	0.034	.588	-0.087	0.043	.041	-0.091	0.039	.021	0.011	0.039	.787
Work-home interference	-0.050	0.023	.027	-0.039	0.026	.142	-0.013	0.031	.682	-0.022	0.029	.455	-0.099	0.029	.001
Job Resources															
Work autonomy and variety	0.072	0.019	<.001	0.093	0.023	<.001	0.058	0.027	.033	0.072	0.024	.002	0.050	0.024	.037
Fairness	0.101	0.023	<.001	0.150	0.026	<.001	0.070	0.030	.018	0.115	0.029	<.001	0.069	0.029	.016
Leadership and company culture	0.110	0.025	<.001	0.036	0.029	.212	0.085	0.032	.008	0.127	0.031	<.001	0.096	0.030	.001
Development opportunities	0.061	0.022	.006	0.021	0.023	.361	0.094	0.028	.001	0.065	0.027	.017	0.071	0.026	.006
Peer support	0.046	0.017	.007	0.053	0.022	.015	0.049	0.024	.040	0.049	0.023	.032	0.027	0.021	.192

Results from fixed effects regressions across three waves. Analyses were adjusted for age

mental health for the ordinary personality type ($ey/dx = 0.073$, $p = 0.005$; $ey/dx = 0.072$, $p = .020$; respectively). Work autonomy and variety were positively related to mental health for the resilient personality type ($ey/dx = 0.078$, $p = .041$), and leadership and company culture were positively related to mental health for the overcontrolled and undercontrolled personality types ($ey/dx = 0.104$, $p = 0.027$; $ey/dx = 0.134$, $p = .002$; respectively).

Discussion

This study revealed that the Big Five personality traits can be clustered into specific personality types. Furthermore, the results showed that different personality types perceive job demands and resources differently and, accordingly, also differ in work engagement and mental health. Moreover, the associations between job demands and resources and outcomes

(work engagement and mental health) seem to depend on an employee's personality profile. In line with the JD-R model, within the different personality types job demands were primarily associated with mental health, whereas job resources were primarily associated with work engagement.

Employees belonging to the ordinary personality type (relatively low neuroticism and average on other traits) were, compared to employees belonging to the other personality types, in the middle to upper middle range regarding their assessment of job demands and resources, work engagement, and mental health. For this group, lower physical demands and work-home interferences and more job resources were positively associated with their work engagement. Also, lower job demands and more work autonomy and variety, as well as fairness were positively related to mental health.

The resilient personality type felt more engaged and reported a better mental health than the other personality types. Not surprisingly, they had relatively low assessments of job

Table 4 Associations of job demands and job resources with mental health across personality types

Mental health	Ordinary (obs. = 2896, n=1240)			Resilient (obs. = 1824, n=800)			Strained (obs. = 1493, n=656)			Overcontrolled (obs. = 1572, n=693)			Undercontrolled (obs. = 1905, n=818)		
	<i>ey/dx</i>	<i>SE</i>	<i>p</i>	<i>ey/dx</i>	<i>SE</i>	<i>p</i>	<i>ey/dx</i>	<i>SE</i>	<i>p</i>	<i>ey/dx</i>	<i>SE</i>	<i>p</i>	<i>ey/dx</i>	<i>SE</i>	<i>p</i>
Job Demands															
Physical demands	-0.112	0.040	.006	-0.032	0.057	.576	-0.064	0.063	.308	-0.016	0.060	.786	-0.117	0.057	.041
Work-home interference	-0.071	0.031	.023	-0.084	0.044	.053	-0.164	0.045	<.001	-0.171	0.044	<.001	-0.093	0.043	.030
Job Resources															
Work autonomy and variety	0.073	0.026	.005	0.078	0.038	.041	0.070	0.040	.078	0.016	0.036	.650	0.047	0.035	.177
Fairness	0.072	0.031	.020	0.072	0.043	.093	0.038	0.044	.390	-0.029	0.043	.504	0.071	0.042	.091
Leadership and company culture	0.059	0.034	.082	0.036	0.047	.447	0.012	0.047	.805	0.104	0.047	.027	0.134	0.043	.002
Development opportunities	0.019	0.030	.536	-0.005	0.039	.887	0.067	0.041	.104	0.055	0.041	.180	-0.004	0.038	.920
Peer support	0.040	0.024	.093	0.055	0.036	.120	0.061	0.035	.083	0.042	0.034	.222	0.028	0.030	.344

Results from fixed effects regression across three waves. Analyses were adjusted for age

demands (although physical demands were assessed lower by the ordinary personality type) and high assessments of job resources. For this personality type, job demands were unrelated to work engagement and mental health. As suggested by their name, this group seems indeed resilient. Employees belonging to this group occupy personality traits (low neuroticism and high agreeableness, extraversion, conscientiousness, and openness to experience) that are beneficial for well-being, functioning, and health (Oshio, Taku, Hirano, & Saeed, 2018). Regardless of their resilient traits, the work engagement of these employees could be enhanced by more autonomy, variety, and fairness, as well as more peer support. More autonomy and variety were also associated with better mental health.

The strained personality type (relatively low agreeableness and above-average values on other traits) reported average assessments of work engagement and mental health. While these employees reported average assessments of experienced job resources, they rated their job demands higher than the other personality types. People low on agreeableness are characterized as egocentric, irritable and competitive (e.g., Bruck & Allen, 2003) and since job demands may obstruct the pursuit of personal interests and goals (due to high openness and conscientiousness), they may experience job demands – especially work-home interference – as more taxing than their agreeable counterparts who are helpful, cooperative and good-natured. For the strained personality type, physical demands were associated with lower work engagement, and work-home interference was associated with lower mental health. Work engagement was enhanced to the extent that employees perceived more job resources, such as autonomy and variety, fairness, leadership and company culture, development opportunities and peer support.

The overcontrolled personality type (high neuroticism, low extraversion) assessed work engagement and mental health relatively low. Moreover, employees belonging to this personality type assessed job demands above average and job resources below average. These results are in line with prior research showing that both neuroticism and extraversion are related to perceptions of job demands and resources, and happiness, work engagement, and well-being (Bakker et al., 2010; Janssens et al., 2019; Weiss et al., 2008; Wilmot et al., 2019). Moreover, physical demands related negatively to work engagement, while all job resources related positively to work engagement. However, few relationships existed between job demands and resources and mental health. Only a reduction in work-home interference and improved leadership and company culture were related to better mental health.

Employees with an undercontrolled personality type (low extraversion, openness, agreeableness, conscientiousness, and high neuroticism) reported the lowest work engagement and worst mental health. Compared to the other personality types, the employees in this group judged their demands to be relatively high (but less high than strained employees) and their

job resources to be lowest. Employees low on agreeableness are less communion-striving and employees low on conscientiousness are less achievement-striving. The combination of low agreeableness and conscientiousness hinders interpersonal interactions and negatively affects the functioning of work teams (Penney, David, & Witt, 2011). In addition, the low extraversion implies that persons in this group are reserved and interact less. Also, employees who are high on neuroticism and low on extraversion are disposed to be less satisfied with their job (Timothy A. Judge, Heller, & Mount, 2002). This may explain why undercontrolled employees report sub-optimal work conditions. With the exception of peer support, all resources had a positive relation with work engagement. However, both work engagement and mental health of the undercontrolled personality type benefited most from a positive leadership and company culture. In addition, better mental health was associated with lower job demands.

While differences in the perception of work characteristics were observed across the different personality types it is unclear whether personality colors the perception of the work environment or whether employees with a specific personality select themselves into specific jobs, e.g., with little resources and high demands. However, by applying a fixed-effect approach our analyses control for time stable confounding factors in the associations of work characteristics with engagement and mental health. In consequence, these findings represent a strong indication for the independent associations of work characteristics with work engagement and mental health.

Theoretical Implications

In accordance with the scientific literature, five prototypical personality types were identified and could be described in line with previous findings (e.g., Herzberg & Roth, 2006; Roth & von Collani, 2007). This finding points to a universal classification of the Big Five personality characteristics into personality types, especially since our sample does not concern the general population, but a working population.

Given that personality types perceived job demands and job resources differently and that these work conditions related differently to work engagement and mental health by personality types suggest that the JD-R model should include personality type as a significant variable. Depending on the research question at hand, researchers could treat personality type as an important control variable or moderator, or they could conduct multi-group comparisons when testing the JD-R model. Furthermore, future research on the JD-R model could use primarily within-person designs to account for individual level factors. That is, personality type could be treated as a random-effect variable in multi-level analyses.

Practical Implications

Personality characteristics are relatively stable. Both person-environment fit theory (e.g., Van Vianen, 2018) and strengths use theory (Bakker & van Woerkom, 2018) argue that employees fare better if their personality matches their work context. Although the resilient personality type likely easily adapts to various work contexts, the other personality types may need to match work environments that fulfil their specific needs. For example, the results of this study show that although the ordinary type perceived relatively lower job demands, these job demands were associated with both work engagement and mental health. These results indicate that the ordinary type will thrive best in jobs with relatively lower physical demands and less work-home interference. However, the results of this study also show that a positive work context in which employees experience autonomy and variety, fairness, support from their supervisor and peers, and development opportunities, fulfils the needs of all employees, irrespective of their personality. Consequently, while organizations may want to attract resilient personality types in particular, also other personality types can be attracted because these personality types can be as engaged and healthy as the resilient type when the work context fulfils their universal and idiosyncratic needs (see Van Vianen, 2018). Moreover, a positive work context such as a strong justice climate can mitigate the possible negative outcomes (e.g., emotional exhaustion) of personality heterogeneity in teams (David et al., 2019).

Limitations and Future Directions

This study is not without limitations. First, personality traits were measured with an abbreviated questionnaire, substituting measuring accuracy with questionnaire length in terms of

number of items and resulting in lower internal consistencies. Cronbach's alphas ranged between .42 and .60. However, our results corroborate the five personality types that were found in prior research, which indicate that our findings are trustworthy and offer further support for the generalizability of previous findings. Yet, future studies should measure the Big Five personality traits more comprehensively and test the robustness of the personality types among different samples. Second, we found relatively few significant relationships between job demands and outcomes for the different personality types, which might be due to the low number of job demands that were involved in this study. Therefore, future research should include other job demands that are known to affect work engagement and mental health, such as workload (e.g., O'Connor, Jimmieson, & White, 2018) and emotional demands (e.g., Schaufeli & Bakker, 2004a, 2004b).

Conclusion

In conclusion, this study provided evidence for the existence of personality types. In addition, it showed the significance of distinguishing personality types for employees' perception of the work environment (demands and resources), work engagement and mental health, and how perceptions of the work environment relate to work engagement and mental health. The findings suggest that the JD-R model should incorporate personality type as a relevant moderator. Furthermore, the findings underline the importance of job resources for the work engagement and mental health of all employees but also show that organizations could pay more attention to the match between employee personality type and work conditions.

Appendix

Table 5 Description, factor loadings, and Cronbach's alpha for job demands and job resources

	mean	SD	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	alpha
Job demands								
Physical demands	2.91	0.86						.693
Job requires physical effort				.839				
Exposed to unpleasant conditions (e.g., noise, extreme temperature, odors)				.823				
Work-home interference	2.58	1.33						.758
Having time pressure / several tasks at the same time				.561				
Work demands interfere with home and family life				.824				
Time for job makes it difficult to fulfill family responsibilities				.831				
Job strain makes it difficult to fulfill family duties				.831				
Having many business obligations in leisure time				.488	-.404			

Table 5 (continued)

	mean	SD	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	alpha
Job resources								
Work autonomy and variety	4.11	0.81						.470
Job allows to make own decisions							.744	
Job involves a great deal of task variety							.823	
Fairness	3.64	0.81						.649
Being rewarded fairly at work				.660	.326			
Rules and procedures to make decisions are fair				.633	.301			
Supervisor treats me is fair				.675				
Leadership and company culture	3.75	0.75						.835
Supervisors have confidence in those they manage			.528	.558				
Supervisors give good guidance			.574	.516				
Supervisors show understanding of employees			.426	.621				
The supervisor clearly communicate requirements and objectives			.698					
Supervisors talk to people if dissatisfied			.659					
All employees have good understanding of what the organization is trying to do			.660					
All employees are aware of the long-term plans and direction of the company			.686					
Development opportunities	3.47	1.01						.742
The company is interested in development of professional knowledge and competences				.361	.539			
Employees expected to fit a new position best are predominantly promoted					.834			
Employees characterized by outstanding job performance are predominantly promoted					.814			
Peer support	4.28	0.72						.673
Receiving help and support from colleagues if required						.834		
Offering help to colleagues						.881		

N = 13,922. Rotated factors loadings ≥ .3 are shown; bold values indicate the factor chosen for a dimension; some leadership items (supervisors have confidence in those they manage, supervisors give good guidance, supervisors show understanding of employees) load high on the fairness factor, but based on theoretical reason the fairness factor only comprised the three fairness items and the concerned leadership items were assigned to the leadership and company culture factor

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Data Availability The data that support the findings of this study are available from the Research Data Centre (FDZ) of the German Federal Employment Agency (BA) at the Institute for Employment Research (IAB). Data used for this study can be assessed on request (<http://fdz.iab.de>).

Declarations

Ethics Approval This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Commission of the Medical Faculty Mannheim of the University of Heidelberg (2018-514 N-MA).

Consent to Participate All participants gave informed consent.

Consent for Publication Publication has been approved by all co-authors.

Conflict of Interest Joachim E. Fischer has received royalties for lectures regarding occupational health from various companies and public agents. The authors declare that they have no conflict of interest.

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