

ORIGINAL ARTICLE

The Ambivalence of Job Autonomy and the Role of Job Design Demands

Jan Dettmers* and Franziska Bredehöft†

This study aims to explain potentially detrimental effects of job autonomy by introducing the concept of job design demands (JDD); that is, when workers are confronted with jobs that are poorly regulated by the organization, the opportunity to design their own job may become an unavoidable requirement. A cross-sectional study of 417 workers reveals that the link between autonomy and emotional exhaustion is twofold. First, autonomy is associated with reduced emotional exhaustion; second, autonomy is associated with increased JDD, which are positively related to emotional exhaustion. A longitudinal study of 236 workers confirms this result with regard to the effect on cognitive irritation and provides stronger evidence for causality and the direction of the effects. Furthermore, study 2 identifies the specific content of JDD that imposes strain effects on workers. The study results imply that autonomy—despite its prevailing strain-reducing effects—is associated with demands that may impair well-being. Interventions aimed at increasing autonomy should also account for the implied additional effort in terms of JDD.

Keywords: autonomy; job design; flexibility; TMGT; job resources

With its positive influence on such outcomes as performance, work motivation and health, job autonomy has long been considered one of the most important job resources by different models of job design (e.g., Bakker & Demerouti, 2007; Gagné & Deci, 2005; Hacker, 2003; Hackman & Oldham, 1976; Humphrey et al., 2007; Karasek & Theorell, 1990; Spector, 1986). Most models of job design assume a linear relationship between autonomy and the abovementioned outcome variables, which implies that the more autonomy workers have, the better off they are. However, some scholars also state that there can be negative side effects or *too much of a good thing* (TMGT; Grant & Schwartz, 2011; Pierce & Aguinis, 2013). The vitamin model (Warr, 1994) assumes curvilinear relationships between workers' autonomy and well-being. 'Too much autonomy as well as too little is often seen as undesirable' (Warr, 1987: 30). According to Warr (1987), too much autonomy may entail difficult decision making and unremitting personal responsibility, which can lead to an overload of strain. Some recent studies have found empirical evidence for this assumption (e.g., Joensuu et al., 2010; Kubicek, Korunka, & Tement, 2014; Meyerding, 2015).

Although the vitamin model and the TMGT approach offer a general theoretical framework for potentially negative effects of autonomy, they do not provide

evidence for specific explanations of these effects on employee well-being. We still do not know why, under what conditions and through which processes autonomy may have detrimental effects. The present study tries to fill this research gap by uncovering the path by which autonomy may have demanding effects.

We introduce the concept of *job design demands* (JDD), which is the demand to make decisions on various aspects of one's own job design. We propose that high autonomy is associated with this need to make decisions regarding the design and pursuit of one's job. This can be considered a job demand, as it can be associated with supplemental efforts and psychological costs (Bredehöft et al., 2015). By investigating the intervening role of JDD within the association between autonomy and impaired well-being in a cross-sectional and longitudinal study, this paper expands the existing research on job autonomy. The paper challenges the assumption that autonomy is related to well-being only in a positive way by demonstrating that autonomy can—at least partially—lead to increased effort and experiences of stress. Thus, this paper provides a more differentiated view of job autonomy as a fundamental job characteristic.

Job Autonomy

Job autonomy—the opportunity to decide when, where, and how a job is done—has been extensively examined in the research on job design. Many job design models, such as the job characteristics model (e.g., Hackman & Oldham, 1976), the job demand-control model (e.g., Karasek, 1979), action regulation theory (e.g., Frese & Zapf, 1994; Hacker,

* FernUniversität in Hagen, DE

† Universität Hamburg, DE

Corresponding author: Jan Dettmers
(jan.dettmers@fernuni-hagen.de)

2003) and the job demands-resources (JD-R) model (e.g., Bakker & Demerouti, 2007), consider job autonomy to be an important resource at work. Hackman and Oldham (1976) state that autonomy is 'the degree to which the job provides substantial freedom, independence and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out' (258). Later research has extended this definition to include independence, freedom and the autonomy to make decisions, schedule work and choose the methods with which to complete work tasks (Morgeson & Humphrey, 2006). Within research on autonomy, different phrases are used (e.g., job control, decision latitude) for denominating very similar constructs, as they are closely related. Despite minor conceptual differences between the constructs, in this paper we use the term job autonomy to characterize high decision latitude and control over work tasks, over the methods for executing those tasks and over the work schedule.

Autonomy influences the individual experiences of responsibility for one's own work outcomes (Hackman & Oldham, 1976) and has been shown to have positive effects on several behavioral, attitudinal and well-being outcomes, such as performance (Dysvik & Kuvaas, 2011; Humphrey et al., 2007), innovative work behavior (De Spiegelaere et al., 2014), organizational commitment (Spector, 1986), internal work motivation (Dysvik & Kuvaas, 2011), work engagement (De Spiegelaere et al., 2014), job satisfaction (De Jonge & Schaufeli, 1998; De Lange et al., 2004; Spector, 1986), absenteeism (Humphrey et al., 2007; Spector, 1986), emotional exhaustion (De Jonge & Schaufeli, 1998; De Lange et al., 2004) distress (Spector, 1986; Thompson & Prottas, 2005) and turnover (Humphrey et al., 2007; Spector, 1986). Moreover, autonomy is thought to buffer against some negative effects of job demands, such as workload or time pressure (Bakker & Demerouti, 2007). According to the job-demand-control model (Karasek, 1979), in which autonomy or control is *the* central job resource, autonomy transforms a highly demanding job into an active job, which is associated with a variety of positive outcomes and is preferable to a less demanding job with less autonomy (Karasek, 1979).

Theoretical models have provided different explanations for the positive effects of high autonomy. The job characteristics model (Hackman & Oldham, 1976) presumes a motivational effect of autonomy through the experience of greater responsibility. According to the job demand-control model (e.g., Karasek & Theorell, 1990), control at work reduces stress and increases learning opportunities. Furthermore, control buffers against the negative impact of job demands on stress (Karasek, 1979), although this assumption lacks consistent empirical support (van der Doef & Maes, 1999). Similarly, the JD-R model (Bakker & Demerouti, 2007; Bakker et al., 2003) assumes that the positive effect of autonomy is caused by a learning effect, since employees with job autonomy—which allows them to experiment with new behaviors and ideas—have more opportunities to learn new behaviors than those who lack job autonomy (Bakker et al., 2003; De Spiegelaere et al., 2014). Moreover, autonomy offers the opportunity to exercise judgment, which fosters feelings

of efficacy and the ability to handle the environment (Karasek, 1979). According to self-determination theory, autonomy at work is one aspect that fulfils the basic human need for autonomy in life (Bakker & Demerouti, 2007; Bakker et al., 2010; Gagné & Deci, 2005; Schaufeli & Taris, 2014; van den Broeck et al., 2008), and the satisfaction of this need fosters physical and psychological health at work (Baard et al., 2004; Gagné & Deci, 2005; Johnston & Finney, 2010; Sheldon et al., 2001; Sheldon & Niemiec, 2006).

In addition to findings on the positive effects of high levels of job autonomy, low levels of autonomy are significantly related to depleted physical health (Hammar et al., 1994), impaired psychological well-being (Daniels & Guppy, 1994) and mental illnesses (Joensuu et al., 2010). More specifically, workers with low degrees of autonomy do not have the opportunity to choose their own measures by which to address a situation and to respond to job demands. Furthermore, they dispose of fewer coping strategies for managing stressors than do those with higher levels of autonomy (Bakker & Demerouti, 2007; Frese & Zapf, 1994). The long-term effects of the inability to cope with potential stressors will be the draining of an individual's energy and create an increase in exhaustion over time (Demerouti, Bakker, Nachreiner & Schaufeli, 2001). We therefore propose Hypothesis 1 as follows:

Hypothesis 1: Experienced job autonomy is negatively related to emotional exhaustion.

Costs of Autonomy

Semmer (1990) argues that the opportunity to control most aspects of one's life—including the working life—to make one's own decisions or at least to be involved in decision making, is part of a human approach to conducting both life in general and a work design that fosters personal development. However, based on theory and empirical evidence, we propose a differentiated view of job autonomy. Warr (1987) argues in his vitamin model that job autonomy has curvilinear associations with well-being. Just as certain vitamins can cause harm to the body when the dosage becomes very high, certain job characteristics might have detrimental effects when they exceed a certain level. Similarly, the TMGT approach (Pierce & Aguinis, 2013), which refers to normally beneficial circumstances causing harm when taken too far, is applicable to potentially curvilinear effects of autonomy on impaired well-being. The common 'more is better' assumption of many research hypotheses may lead to the wrong conclusion that linear effects best describe the relations between antecedents and outcomes. For job autonomy, low levels may have a negative impact on well-being. Therefore, an increase in job autonomy might enhance well-being up to a certain point. A further increase in job autonomy beyond this turning point can result in neurophysiological overactivation (Baltes et al., 2002) and overload strain when high job demands exceed personal capabilities (Warr, 2011).

The empirical evidence regarding the curvilinear effects of autonomy is rather inconsistent; a number of studies that have aimed to test the curvilinear effects

have not found empirical support for the assumption of the vitamin model or TMGT (e.g., De Jonge et al., 2000; Parkes, 1991); in some cases, these studies have found an unexpected u-shaped relationship between autonomy and job satisfaction or an inverted u-shaped relationship between autonomy and emotional exhaustion (De Jonge & Schaufeli, 1998; Rystedt et al., 2006), indicating that small and high levels of job autonomy are related to better well-being outcomes. Other studies have indeed found empirical support for a TMGT effect of job autonomy on various outcomes; Baltes et al. (2002) empirically shows a curvilinear relationship between autonomy and job satisfaction. Meyerding (2015) confirms Warr's vitamin model for 12 job characteristics, among which is autonomy. Joensuu et al. (2010) shows that low skill discretion and very high decision authority are linked to an increased risk of hospital admission for mental disorders, and a recent study by Kubicek, Korunka and Tement (2014) reports the curvilinear effects of autonomy on well-being in eldercare workers. We therefore propose Hypothesis 2 as follows:

Hypothesis 2: Experienced job autonomy is curvilinearly associated with emotional exhaustion in the way that low and very high levels of autonomy are associated with increased emotional exhaustion.

Individual Job Design Demands (JDD)

Although the vitamin model and the TMGT approach offer a general theoretical framework for the curvilinear effects of autonomy, they do not provide specific explanations for why and by which means autonomy may exert a (partially) detrimental effect on employee well-being. Ehrenberg (2009) associates the generally higher level of work autonomy in modern societies with the continuous demand to make decisions and the attribution of success and failure to the autonomous individual that may compromise employee psychological well-being. Väänänen and Toivanen (2018) introduce the notion of *tied autonomy*, and argue that in highly developed working conditions, the formal task-related autonomy of the predominant knowledge workers is framed by broader organizational demands and interdependencies that actually undermine the given autonomy. We propose the concept of individual JDD as an explanatory factor for the potential detrimental effects of autonomy.

In modern organizations, a general trend has been the tendency to decentralize decisions and responsibilities. Thus, decisions and responsibilities are transferred downward from higher management to separate branches, to working teams and to the individual (Alexander, 1991; Allvin et al., 2011; Hacker, 2003; Sichler, 2006). This structure allows employees to experience more autonomy in executing their work (Wood, 2011). In addition, employees are increasingly forced to direct their work goals towards the market and to adjust procedures to optimize task fulfilment. The organizational regulatory frameworks of working procedures thus become less pronounced; hence, the demands of the market influence the design of work, and work itself becomes increasingly flexible (Allvin et al., 2011). A growing number of workers are confronted by jobs that are, to a lesser extent, defined,

designed and regulated by the organization. Jobs become less framed by direct guidance or rules that employees must or can follow. Job design, as a core organizational task, is increasingly delegated to the specific employee. This takes place either in the form of a proactive and discrete behavior such as job crafting (e.g., Demerouti & Bakker, 2014) or in the form of a fundamental job requirement to participate in designing one's own job because a given job design does not exist.

In their approach to boundaryless work, Allvin et al. (2011) provide a conceptual framework that describes the relationship between organizational regulation, autonomy at work and employee requirements. They describe three levels of organizational regulation. Highly regulated jobs are those in which working conditions are regulated in all four dimensions of time, space, performance and cooperation. Jobs low in regulation are those in which working conditions are only regulated in one or two of the abovementioned dimensions. Finally, unregulated jobs are characterized as having no regulations regarding time, space, performance and cooperation. Unregulated working conditions are accompanied by irregular working hours, a flexible work location, unstandardized operating procedures, an ambiguously defined area of responsibility, an unclear chain of command and a lack of collaboration provisions (Allvin et al., 2011). These unregulated working conditions, in which autonomy is high, can entail personally defining, structuring and planning one's work and taking responsibility for work outcomes (Bredehoeft et al., 2015). The individual must determine when, where, how, with what and with whom to work, leading to flexibility in time, space, performance and cooperation (Allvin et al., 2011). Thus, under very high levels of autonomy, self-organization, difficult decision making and personal responsibility for the performance and completion of one's own work can become unavoidable requirements (Allvin et al., 2011; Sichler, 2006; Sonnentag & Frese, 2003; Warr, 1987; Warr, 1994).

With regard to the detrimental effects of high autonomy, Hoeye and Hornung (2015) demonstrate that flexibility and the need to make decisions on one's own work procedures is not only a resource, it can also become a requirement in work settings characterized by a high need for self-organization and self-control and the reduced direct control of the organization. Hoeye (2011) identifies four dimensions of flexibility requirements: (a) requirements for self-organization, (b) requirements for self-directed career development, (c) requirements for self-directed learning and (d) requirements for temporal flexibility. Significant correlations are found for all forms of flexibility requirements and strain indicators, signifying that flexibility requirements can be considered a job demand (Hoeye, 2011).

In this vein, Kubicek, Paškvan and Korunka (2014) claim that, due to an increase in autonomy, new demands have been imposed upon the individual. As a result of work intensification, an increase in intensified job-related planning and decision-making demands (IJP), intensified career-related planning and decision-making demands (ICP), intensified knowledge-related learning demands (IKL) and intensified skill-related learning demands (ISL)

can be observed. These demands all relate positively to emotional exhaustion after controlling for traditional job demands, such as time pressure. The authors remark that ‘an ever-growing amount of planning and decision making and learning has detrimental effects on employees’ well-being’ (Kubicek, Paškvan & Korunka, 2014, p. 14).

Similarly, Bredehoeft et al. (2015) postulate the demand of individual job designs resulting from high levels of autonomy. The authors find several design strategies that employees with very high levels of autonomy have to use to work efficiently, ensure long-term professional success and preserve internal resources. These strategies include designing working procedures and processes, creating self-motivation, promoting one’s career, and shaping relationships with coworkers and customers. Exerting these strategies along with completing the core job tasks may result in additional effort (Bredehoeft et al., 2015).

Based on these considerations, we assume that aside from the positive effects of autonomy, high levels of autonomy may also have a demanding component. The opportunity for responsibility and individual work design can represent an ‘unavoidable requirement’ (Warr, 1994, p. 89), which is associated with additional effort and increases in impaired well-being. Examples of these JDD are investigated under the notion of; ‘job-related planning and decision-making demands’ (Kubicek, Paškvan & Korunka 2014, p. 1) or ‘requirements for self-organization’ (Hoegel, 2011, p. 5). We propose that job autonomy is associated with JDD, which may be associated with increased work-related stress and resource depletion, and thus higher emotional exhaustion. We assume that the stress-decreasing effect of job autonomy is stronger if we control for the effect of JDD.

Hypothesis 3a: JDD are positively associated with (a) autonomy and positively associated with (b) emotional exhaustion.

Hypothesis 3b: The negative relationship between job autonomy and emotional exhaustion is stronger if we control for the effect of JDD.

Study 1

Method

To test the proposed hypotheses, we conducted an online cross-sectional study. A sample of 417 workers was recruited through the ISO-certified (ISO 26362) German online panel provider Respondi (www.respondi.com). Respondi operates online access panels in ten European countries using a multisource recruitment of participants (online, offline, CATI), with a focus on the intrinsic motivation of the target groups rather than on financial incentives. By performing continuous quality controls, the panel operators ensure the high integrity and validity of the survey results. Considering the appearance of high degrees of autonomy and requirements for self-organization, we formulated recruitment criteria that included full-time employment and a university degree. In addition, the invited participants primarily worked in service sector jobs, such as IT services, communication, financial services, media, trade and commerce, or aviation.

We chose these criteria to reduce the impact of differing job types, job complexity and varying work hours on the specific outcome variables. The final sample consisted of 416 workers (34% female) primarily employed in service sectors such as IT and technical services (36%), financial services and consulting (15%), other service areas (12%), wholesale (7%), media (4%), and other branches (26%). Of these participants, 41% had a supervisory role. The mean age of the employees was 40 years ($SD = 10$ years), 74% were married or lived together with a partner, and 38% had children. On average, the participants worked 42 hours a week ($SD = 5$ hours).

Measures

Autonomy

Autonomy was assessed using 4 items from the job control scale of the Instrument for Stress-Oriented Job Analysis (ISTA, Semmer et al., 1998). One sample item is ‘Considering your work activity in general, how much opportunity is there for you to make your own decisions?’ Responses were made on a 5-point Likert scale ranging from 1 (very little) to 5 (very much). The reliability for this measure was $\alpha = 0.82$.

Job Design Demands (JDD)

JDD were assessed using a 5-item subscale of the Requirements for Self-Organization Scale by Hoegel (2011). One sample item is ‘In my work, my supervisor expects me to constantly optimize my working methods’. Responses were made on a 5-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). The reliability for this measure was $\alpha = 0.82$.

Emotional Exhaustion

We assessed emotional exhaustion using 7 items of the German version (Enzmann & Kleiber, 1989) of the Emotional Exhaustion Scale taken from the Maslach Burnout Inventory, 2nd Edition (Maslach & Jackson, 1986). One sample item for emotional exhaustion is ‘I feel burned out from my work.’ The participants rated the 7 items on a 7-point scale ranging from 1 (never) to 7 (daily). The reliability for this measure was $\alpha = 0.93$.

Table 1 displays the mean values, standard deviations and intercorrelations of the study variables.

Analysis and Results

To analyze the relationships between autonomy, individual JDD and emotional exhaustion, we employed

Table 1: Means, Standard Deviations, and Correlations Between the Study Measures (Study 1).

	<i>M</i>	<i>SD</i>	1	2	3
1. Autonomy	3.42	.78			
2. Autonomy ²	1.00	1.50	-.20**		
3. Job Design Demands	3.80	.66	.41**	.12*	
4. Emotional Exhaustion	3.34	1.48	-.22**	.08	.01

Note: Autonomy² = Squared value for autonomy. * $p < .05$; ** $p < .01$.

structural equation modeling (SEM) techniques using MPlus 6.12 (Muthén & Muthén, 2011) and one-tailed tests of significance. To test the hypothesis regarding the quadratic effects of autonomy, we applied Klein and Muthén's (2007) approach to estimate quadratic effects in SEM. For these tests, the χ^2 statistic and complementary goodness-of-fit indices are not available. However, as a preliminary step in the analyses, we tested the measurement model that defines the relationship between all observed and unobserved study variables. The results of a confirmative factor analysis showed that the model exhibited a reasonable fit to the data ($\chi^2 = 388.38$; $df = 19$; $p < 0.01$; CFI = 0.92; TLI = 0.91; RMSEA = 0.080; SRMR = 0.068, AIC = 18291.59).

To test *H1* and *H2*, we ran SEM, including the linear and curvilinear effects of autonomy on emotional exhaustion. As expected, job autonomy was negatively related to emotional exhaustion ($\beta = -0.24$, $p < 0.01$). However, the quadratic effect of job autonomy on emotional exhaustion was not significant ($\beta = -0.02$, *n. s.*).

Next, to test *H3a* and *H3b*, we included the JDD variable in the model (**Figure 1**). In this model, job autonomy was positively related to JDD ($\beta = 0.54$, $p < 0.01$). Furthermore, the quadratic effect of job autonomy on JDD was significant ($\beta = 0.17$, $p < 0.01$). JDD in turn was positively related to emotional exhaustion ($\beta = 0.154$, $p < 0.05$). The direct relationship of job autonomy on emotional exhaustion was more pronounced and decreased to $\beta = -0.34$ ($p < 0.01$) compared to the simple regression model. The quadratic effect of job autonomy on emotional exhaustion was still not significant ($\beta = -0.03$, *n. s.*).

Discussion

The results of study 1 partially supported the proposed hypotheses. As expected, job autonomy is associated with lower emotional exhaustion as an indicator of job stress-related impaired well-being, thereby supporting Hypothesis 1. This finding can be explained by the beneficial effect of job autonomy on attaining work-related goals and better coping options (e.g., Bakker & Demerouti, 2007). The study did not replicate research findings regarding curvilinear effects. Hypothesis 2 was not supported, as the quadratic effect of job autonomy on emotional exhaustion was not significant. In the included study sample, no turning point regarding the autonomy-strain relationship could be detected. For all levels of

autonomy, an increase in autonomy corresponded to a decrease in emotional exhaustion.

However, supporting Hypothesis 3a, the study results demonstrate that job autonomy may also be associated with demands that are related to higher degrees of emotional exhaustion. Job autonomy may come with higher requirements for self-organization and optimization, i.e., JDD, which may impose additional demands on employees. The results support this assumption by demonstrating that job autonomy is positively related to JDD, which may have negative effects on well-being. In addition to the linear effect of autonomy on JDD, the study detected a u-shaped quadratic effect of autonomy on JDD. The shape of this relationship indicates that with higher degrees of autonomy, the slope of JDD further increases, meaning that particularly high degrees of autonomy are associated with JDD. Furthermore, supporting Hypothesis 3b, the study shows that after controlling for these potentially demanding aspects of autonomy, the residual strain reducing effect of autonomy is stronger.

Taken together, the study results indicate that there is a twofold relationship between autonomy and emotional exhaustion. The total relationship between autonomy and emotional exhaustion (see **Figure 1**) can be separated into a positive indirect relationship via JDD and a stronger residual direct negative relationship between autonomy and emotional exhaustion.

However, there are some limitations to the interpretations of the study results. In particular, the cross-sectional study design of study 1 does not allow causal relationships to be inferred. Furthermore, we cannot exclude reversed effects from emotional exhaustion to JDD. In addition, we still have limited knowledge of the character of the construct of JDD. As the confirmatory factor analysis (CFA) and SEM with the optimizable fit values presented in study 1 indicate, there is still the potential to better operationalize JDD and examine which of their elements in particular may increase impaired well-being. Thus, the aim of study 2 was to deepen our understanding of the results of study 1 while putting the results on a stronger methodological basis to infer for the direction of the relationship. Furthermore, we wanted to gain a more differentiated understanding of the content of JDD and the effects of their specific facets.

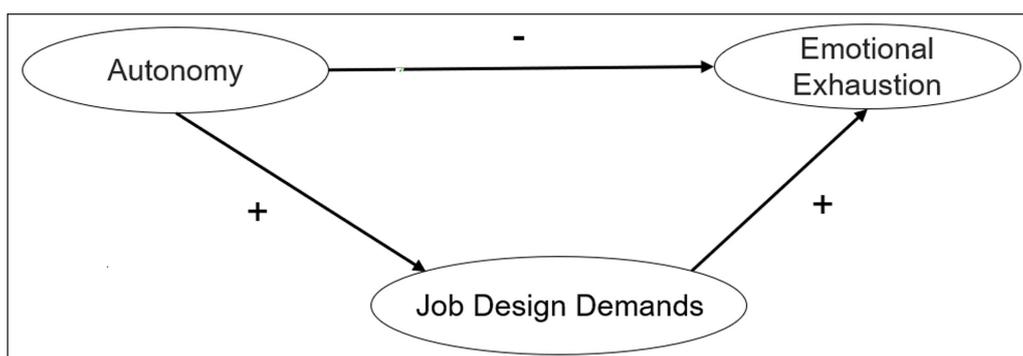


Figure 1: Overview of the Proposed Research Model.

Study 2

To re-examine and refine the construct of JDD and to investigate their content and effect, we based study 2 on the results of a qualitative interview study focusing on job design demands (Bredehoeft et al., 2015) and developed another quantitative approach. The interviews were conducted with self-employed and highly autonomous employees to explore the specific JDD that are associated with a high degree of autonomy. The participants reported that different aspects of job design were not regulated by external instances such as supervisors or organizational regulation but were established by the decision latitude of single employees. Similar to the content of job crafting concepts such as *task crafting*, *relationship crafting*, *reducing demands*, *increasing challenges*, and *work-life balance crafting* (see Sturges, 2012; Tims et al., 2012; Wrzesniewski & Dutton, 2001), these aspects of the employees' individual job designs concerned task selection, the temporal order of single tasks, the required intensity of task fulfilment, social interactions, work time, recovery and the development and change of the job content. However, in contrast to job crafting, the reported aspects of individual job design were not optional, proactive behaviors but rather unavoidable requirements for properly completing one's own work tasks in a sustainable way (Bredehoeft et al., 2015).

As in study 1, we refer to JDD as potentially detrimental aspects of autonomy; they encompass the *need* to make decisions, plan and organize work, develop one's job and optimize ways of working. JDD can be considered demands in terms of the JD-R model (Bakker & Demerouti, 2007), as they require increased cognitive effort and may be associated with psychological costs.

Based on the considerations made in the theoretical section and on the results of study 1, we expected autonomy to be positively associated with JDD. Furthermore, we expected JDD to impose a sustained cognitive effort on workers, which is associated with psychological costs. In the rather short term, the increased effort to achieve work goals may cause rumination (Klinger, 1975). This is indicated by the construct of cognitive irritation (Mohr et al., 2006). Irritation is considered to be a work-related state of mental impairment involving rumination (i.e., the cognitive aspect of irritation) and irritability (i.e., the emotional aspect of irritation; Mohr et al., 2006). The rumination aspect can be considered a short-term effect of work stress and an early antecedent of more serious impairments such as depression or anxiety (e.g., Dormann & Zapf, 2002). In study 2, we focused on the longitudinal effects of JDD in a limited time frame. We therefore chose the short-term indicator of cognitive irritation and formulated it as a hypothesis as follows:

H4: JDD are positively related to an increase in cognitive irritation.

In addition to Hypothesis 4, study 2 also aimed to retest the direct effects of job autonomy and respective curvilinear effects (H1 and H2) in a longitudinal approach.

Method

To test our hypotheses, we conducted a two-wave online panel study with a time lag of three months between the waves. Before starting the survey, we asked the board of the University of Hamburg for ethical approval of the study, which was granted. To yield a better fit between the chosen time lag and the actual timing of the stressor-strain relationship, we adjusted the time frame of the items to the time lag examined (e.g., 'Please consider your experiences regarding your work and home life in the last three months').

Sample

For study 2, a sample of 484 employees was recruited through the same online panel provider as that used in study 1. Again, we formulated recruitment criteria that included a university degree and regular full-time employment. In addition, only employees who possessed a minimum decision latitude regarding their own work design were allowed to complete the questionnaire. This requirement was realized by a filter item at the start of the survey that asked the respondents if they had the opportunity to individually choose their work time and location. The selection of highly autonomous employees was applied to test for possible negative side effects of high job autonomy. A total of 307 participants completed the survey at T1. Three months after the first measurement, the same participants were invited to complete the second questionnaire. A total of 236 participants (77%) completed the online questionnaire at T2. The online panel provider generated a personal code for each participant to match the questionnaires of the two waves while ensuring anonymity.

We compared the participants in the final panel group ($N = 236$) with the dropouts ($N = 71$) with regard to demographic characteristics (i.e., age, gender, children, relationship status, industrial sector, weekly work hours, supervisor role, and customer contact) and the independent and dependent variables to determine group differences. The results of a MANOVA comparing participation in the second wave with participation in the first wave found no significant differences between the groups in the abovementioned variables (Wilks' $\lambda = 0.969$, $F(11, 295) = 0.866$, $p = 0.575$, $\eta^2 = 0.031$). Therefore, study attrition was not a concern. The final sample consisted of 236 employees (45% female), primarily employed in public service (20%), industry (16%), and IT and other service sectors (18%). Of these participants, 51% had a supervisory role. The mean age of the employees was 42 years ($SD = 10$ years), 78% were married or lived together with a partner, and 31% had children. On average, the participants worked 42 hours a week ($SD = 7$ hours).

Measures

Job Design Demands (JDD)

Based on the interview statements (Bredehoeft et al., 2015), we formulated a set of questionnaire items that capture different aspects of JDD. Instead of asking about actual behaviors or opportunities to individually design the participant's own job, we asked if a specific design

activity was required to properly complete the job. To focus on inherent job requirements rather than proactive behaviors, the items were framed with an introduction stating 'In the following, we ask you how often the self-initiated design of certain job characteristics is required to properly and sustainably complete the job'. Responses to the items were made on a 5-point scale ranging from 1 (never) to 5 (always). The initial set of 18 items was examined by the research team and shortened to 10 items that captured aspects of individual job design, such as 1. *planning and structuring the order of the single tasks that are part of the job* (cf. IJP, Kubicek, Paškvan & Korunka, 2014); 2. *controlling the intensity of the job by regulating quality and effort*; 3. *finding new tasks and initiating new projects*; 4. *designing social interaction*; and 5. *designing work time and recovery*. An initial quantitative item and scale analysis resulted in the deletion of the four items capturing the facets of *designing social interaction* and *designing work time and recovery* due to item quality and scale inconsistency. The remaining items were submitted for a CFA in which we tested a one-factor structure against a 3-factor structure with the correlated factors 1. *planning and structuring the order of the single tasks that are part of the job (planning demands)*; 2. *controlling the intensity of the job by regulating quality and effort (demands to regulate effort)*; and 3. *finding new tasks and initiating new projects (development demands)*. The results favored a correlated three-factor model capturing the three facets separately ($\chi^2 = 17.19$; $df = 6$; $CFI = 0.99$; $TLI = 0.97$; $RMSEA = 0.078$; $SRMR = 0.027$, $AIC = 3989.39$) over a one-factor model ($\Delta\chi^2 = 208.70$; $\Delta df = 3$; $p < 0.00$; $\Delta AIC = 202.70$).

The final scales can be examined in the appendix.

Autonomy

Job autonomy was measured using the German version of the 3-item subscale of the decision-making autonomy scale of the Work Design Questionnaire (WDQ; Stegmann et al., 2010). Responses were made on a 5-point scale ranging from 1 (do not agree) to 5 (totally agree). One sample item is 'The job allows me to make many decisions on my own'. The reliability for this measure was $\alpha_{T1} = 0.91$ and $\alpha_{T2} = 0.93$.

Cognitive Irritation

Cognitive irritation was assessed using three items from the cognitive irritation subscale of the Irritation Scale by

Mohr et al. (2006) that captures ruminating thoughts about one's work and impaired detachment in one's leisure time. A sample item is 'Even at home, I cannot stop thinking about problems from work'. Responses were made on a 5-point scale ranging from 1 (not at all true) to 5 (completely true). The items for this outcome measure were temporally framed with the introductory phrase 'During the past three months...'. The reliability for this measure was $\alpha_{T1} = 0.91$ and $\alpha_{T2} = 0.92$.

Table 2 displays the mean values, standard deviations and intercorrelations of the study variables.

Analysis and Results

The result of a CFA using all the study variables with the three facets of JDD indicates a good fit of the measurement model ($\chi^2 = 151.36$; $df = 75$; $CFI = 0.97$; $TLI = 0.96$; $RMSEA = 0.066$; $SRMR = 0.043$, $AIC = 7663.27$). To test $H4$, we used a model (M1) in which autonomy and autonomy² at T1 were associated with JDD at T1, while all the variables predicted cognitive irritation while controlling for autoregressive effects (Gollob & Reichardt, 1991) (**Figure 2**). To test the curvilinear effect of autonomy on cognitive irritation, we applied Klein and Muthén's (2007) approach to estimate quadratic effects in SEM. The final model was tested against a reversed causation effect model (M2) to test for the direction of causality comparing AIC and BIC.

Figure 2 illustrates the longitudinal effects of autonomy and JDD at T1 on cognitive irritation at T2 while controlling for autoregressive effects. The illustrated model M1 fits the data better than the reversed model M2 ($\Delta AIC = 5454.36$; $\Delta BIC = 5558.80$).

The SEM results show that job autonomy was significantly associated with all three facets of JDD. The significant quadratic effect of autonomy in study 1 could not be replicated on any facet of JDD in study 2. There was a significant negative synchronous effect of autonomy on cognitive irritation ($\beta = -0.27$, $p < 0.01$) but no cross-lagged effect on cognitive irritation at T2 while controlling for the autoregressive effect ($\beta = -0.08$, n. s.). With regard to JDD, the facet of development demands was related to cognitive irritation at T1 ($\beta = 0.29$, $p < 0.01$) and to an increase in cognitive irritation from T1 to T2 ($\beta = 0.18$, $p < 0.05$).

Discussion

The aim of study 2 was to test the assumption that autonomy is associated with demands for employees

Table 2: Means, Standard Deviations, and Correlations Between the Study Measures (Study 2).

	<i>M</i>	<i>SD</i>	1	2	3	4	5
1 Autonomy	3.67	.87					
2 Planning Demands	3.66	.83	.30**				
3 Demands to Regulate Effort	3.50	.87	.37**	.75**			
4 Development Demands	2.70	.90	.20**	.17**	.32**		
5 Cognitive Irritation_T1	2.66	1.05	-.19**	.01	.05	.23**	
6 Cognitive Irritation_T2	2.58	1.11	-.16*	-.04	.40	.28**	.64**

Note: * $p < .05$; ** $p < .01$.

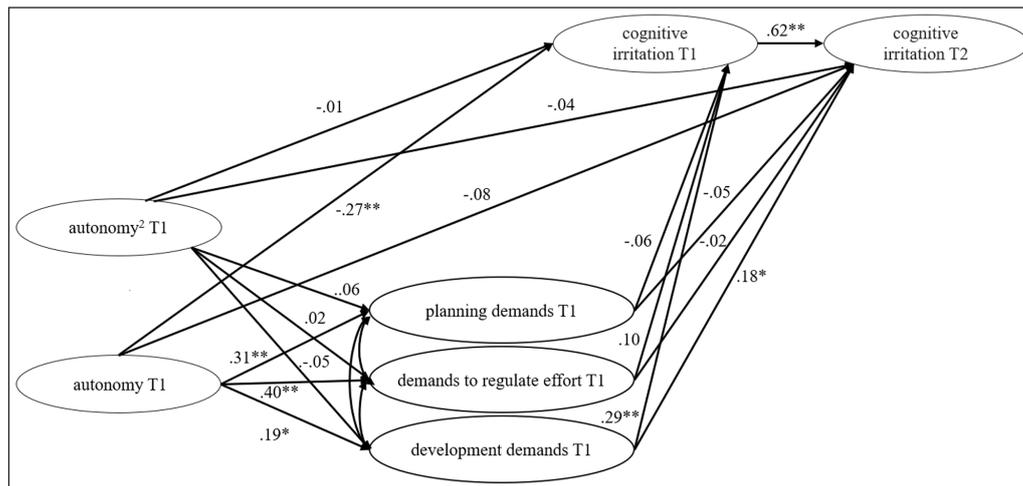


Figure 2: Mediated Effect of Autonomy via JDD.

to design their job correctly to work effectively. The longitudinal design of study 2 was apt to confirm the cross-sectional results of study 1 while providing stronger evidence for the causality and direction of relationships between JDD and cognitive irritation. Essentially, the results of study 2 support the results of study 1. Again, job autonomy was positively associated with JDD. However, the results demonstrate that JDD cannot be considered as a unidimensional construct; however, the demand to design one’s own job may concern different facets of job design, which are all significantly related to job autonomy. With regard to *H4*, which proposed that JDD are positively related to cognitive irritation over time, the study results show that only the facet of *development demands* may lead to an increase in impaired well-being, while the other facets do not show this effect.

General Discussion

The presented studies investigated the differentiated effects of job autonomy on two indicators of impaired well-being and proposed the concept of JDD as a potential explanatory pathway. The results of study 1 support Hypothesis 1; experienced job autonomy is negatively related to emotional exhaustion, which is in line with a great body of empirical evidence in the study of job design (e.g., De Jonge & Schaufeli, 1998; De Lange et al., 2004; Spector, 1986; Thompson & Prottas, 2005). No support could be found for the assumed curvilinear relationships in Hypothesis 2. This result adds to the rather mixed results of studies that try to test the assumption of the vitamin model (Warr, 1987) or the TMGT approach (Pierce & Aguinis, 2013). However, study 1 demonstrated that the relationship between job autonomy and emotional exhaustion is stronger if we control for the effect of JDD (Hypothesis 3b). These JDD, which are strongly related to job autonomy, are in turn positively related to emotional exhaustion (Hypothesis 3a). These findings are in line with the results of Hoeye (2011) and Kubicek, Paškvan and Korunka (2014) regarding the effects of increasing requirements of self-organization and decision making imposed on employees. As JDD are not only related to impaired well-being but also associated with job autonomy, JDD may be considered the ‘dark side’ of autonomy that

decreases its generally positive effects on well-being. In other words, in addition to positive effects, job autonomy may also be associated with an increase in strain through the JDD pathway. Interestingly, the significant quadratic effect of autonomy on JDD indicates that high degrees of autonomy are more strongly associated with higher levels of JDD. This might be an explanation for the curvilinear effects of autonomy on well-being outcomes in the literature (e.g., Kubicek, Paškvan & Korunka, 2014). However, this result could not be replicated in study 2.

Replicating the results of study 1, study 2 demonstrates that job autonomy is positively related to JDD. More specifically, the results indicate that JDD have empirically distinguished facets: *planning demands*, *demands to regulate effort* and *development demands*. All facets are positively associated with job autonomy, indicating that high job autonomy also includes additional job demands. Partially supporting Hypothesis 4, the results show that the facet of *development demands*, but not those of *planning demands* or *demands to regulate effort*, is related to an increase in cognitive irritation over time. Regarding the potentially negative side effects of high autonomy, this result indicates that it is not the cognitive load itself that is associated with the planning and decision demands that impair well-being. Rather, specific aspects such as being responsible for individually developing one’s own job, finding new tasks and initiating new projects may be responsible for this effect.

The results of this paper contribute to the growing discussion regarding the negative side effects of high autonomy (e.g., Ehrenberg, 2009; Kubicek, Korunka, & Tement, 2014; Väänänen & Toivanen, 2018). On the one hand, job autonomy leads to more opportunities to design one’s job, and it offers the opportunity to experience self-determination (Gagné & Deci, 2005; Schaufeli & Taris, 2014; van den Broeck et al., 2008) and self-efficacy at work (Karasek, 1979). On the other hand, it leads to more demands to design one’s job, such as the need for self-organization, optimization and job development, which results in emotional exhaustion or cognitive irritation. While other studies have focused on the empirical evidence for curvilinear effects with very inconsistent results, this study explicitly tests for the means by which

autonomy may have detrimental effects on well-being. The concept of JDD offers a way to explain the negative side effects of job autonomy and provides further insight into the specific demands that are associated with high job autonomy. In particular, the demand to individually make decisions regarding developing one's own job may cause cognitive and emotional demands on the individual that may result in a cognitive load marked by higher levels of cognitive irritation. However, regarding the overall picture, our study results also indicate that the negative effects of autonomy on emotional exhaustion and cognitive irritation prevail the positive effects on these strain indicators. Furthermore, we did not find support for a curvilinear relationship.

Taken together, based on our results, we do not consider high autonomy as a risk per se. However, autonomy can be accompanied by negative side effects in conjunction with its beneficial effects. We assume that—in the absence of organizational frameworks and externally driven job design—high job autonomy can increase the demands imposed upon the individual in planning, structuring, and making decisions regarding the design of that individual's job. When employees cannot fall back on effective work design strategies, these job design requirements can exceed personal capabilities, resulting in overload strain (cf. Warr, 2011).

Implications

Our results imply that raising the level of autonomy given to an employee is not only associated with positive outcomes. High autonomy may be associated with a lack of job design, as organizational frameworks or supervisors transfer the design of the employee's job to the employee. As Allvin et al. (2011) noted, 'in the absence of an external set of rules, the individual has to rely on a corresponding internal and self-imposed set of regulations' (p. 41). Employees have to plan and structure their work, deciding when, where, how much, and how often to work. These increased decision demands and the associated insecurity may have a resource-depleting effect, cause cognitive overload and lead to impaired well-being next to the intended positive effects of autonomy. Accordingly, job design interventions aimed at increasing autonomy and work scheduling should consider the additional effort in the form of JDD that accompanies an increase in job autonomy. When an increase in job autonomy is solely introduced in terms of rationalization, the general positive effects of autonomy can be undermined by the negative effects of JDD.

In addition, high autonomy and the associated JDD may also include the risk of an unfavorable job design. Allvin et al. (2011) provides examples of design strategies that individuals use to cope with the demands of an extremely autonomous work setting. Such strategies include adjusting working time to customer and market demands; global time differences and family needs; renouncing recovery periods; speeding up the pace of one's work; skipping breaks; and deliberately initiating and advancing ever more projects. These examples of self-endangering work behavior (cf. Dettmers et al., 2016) should be counteracted with individual competencies in job design strategies.

Thus, for a sustainable and health-promoting job design, employees need to gain competencies in individual job design (Dettmers & Clauß, 2017; Tims & Bakker, 2010). In light of jobs that are becoming increasingly autonomous and in which employees have to individually design an increasing number of aspects, employers, supervisors and even employees themselves need job design-related expertise. Sichler (2006) identifies various skills that employees need to cope with the requirements of workplaces with high job autonomy. These skills include intellectual flexibility, planning and strategic thinking, taking responsibility, and the independent completion of work tasks. To this list, Dechmann et al. (2013) add the need for resilience against work intensification through social support, cooperation and the efficient organization of work and knowledge. We assume that job design competencies may also address the problem of overload caused by JDD (Dettmers & Clauß, 2017).

Strengths, limitations and further research

The strength of our research is the combination of cross-sectional and longitudinal studies, which allowed us to control for autoregressive effects. Furthermore, the outcome variables, the considered JDD facets, and job autonomy were measured with different operationalizations applied in each study, which may have counteracted simple methodological artifacts that may have caused the found relationships between the variables.

However, our research also has some limitations that must be accounted for when interpreting the results. All the study data are limited to self-report measures. Therefore, data from other sources, such as supervisors or workplace observations, should be included in future studies to address the problem of common method variance. In addition, future studies should replicate the results with larger sample sizes and more diverse occupations than those included in the presented studies, which could question the generalizability of the study results.

In our operationalization of JDD, we focused on three facets of job design: planning, regulating effort and job development. Future studies should expand this scope to other facets of job design, such as designing social interaction at work (Tims et al., 2012; Wrzesniewski & Dutton, 2001), which have also been identified as relevant JDD in the study of Bredehoeft and colleagues (2015). Finally, it is possible that JDD may exert different effects on different people under different boundary conditions. Future studies should focus on the conditions and individual strategies and competencies that may help employees better cope with JDD under conditions of high autonomy. Moderators, such as individual job design competencies (Dettmers & Clauß, 2017), could be incorporated into future studies to investigate whether the negative effect of JDD can be averted when employees adopt the necessary competencies to address these demands. Further qualitative studies addressing the question of strategies that might help to develop training programs for employees to address high levels of JDD could be answered and then validated in quantitative studies.

Conclusion

Our results offer an explanation for the negative side effects that high autonomy may have on well-being outcomes. Providing employees with job autonomy has not only positive effects but also negative side effects that may undermine those positive effects. Job autonomy remains an important job resource; however, a differentiated view is necessary. In situations in which alleged autonomy is actually a managerial tool of rationalization that fails to provide employees with a supportive organizational framework and competencies to effectively use autonomy, the demanding aspect of autonomy is especially likely to undermine the unquestionable positive effects of autonomy proposed by most job design models.

Appendix A

Job Design Demands Scale

Instructions: In the following, we ask you how often the self-initiated design of certain job characteristics is required for you to complete your job properly and sustainably.

1. At work, I must structure my tasks on my own.
2. At work, I must individually organize my tasks to complete them in an effective manner.
3. At work, I must deliberately regulate the effort I spend on certain work tasks.
4. At work, I must adjust the quality for my work results in order to regulate the expenses.
5. At work, I must use periods of lower workload to initiate new projects.
6. At work, I must check at all times if I can undertake additional tasks.

Note:

planning demands = items 1 + 2

demands to regulate effort = items 3 + 4

development demands = items 5 + 6

Competing Interests

The authors have no competing interests to declare.

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