The Role of Self-determination in Dual Processes of Intrinsic Motivation and Health Impairment: An Empirical Integration

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This paper provides an empirical integration of core assumptions of the job demands-resources model and self-determination theory. Path analysis (N = 1008) confirmed the duality of motivational and health impairment process in response to work characteristics that support, respectively constrain the fulfillment of basic needs for autonomy, competence, and relatedness. Both processes were modeled in terms of first-order (intrinsic work motivation and psychological work strain) and second-order outcomes (affective commitment and psychosomatic complaints). Alienation was included as a shared second-order outcome. Individual autonomy orientation affected employee responses as hypothesized.

Keywords: job and work design, motivation, stress and stress management, occupational health and safety, employee relations.

What makes work intrinsically motivating and rewarding, on the one hand, and what makes it stressful and health-impairing, on the other hand, are core questions of job design. The job demands-resources model (JDRM; e.g., Bakker & Demerouti 2007) provides an integrative perspective on positive and negative aspects and outcomes of work. It distinguishes between: a) Job demands that interfere with task fulfillment and the regulation or endurance of which requires psychological and/or physical efforts and costs (e.g., workload, adverse working conditions, and role conflict); and b) job resources, which support the individual in coping with demands, attaining work goals, and achieving learning and growth (e.g., autonomy, learning opportunities, and social support).

A core assumption of the JDRM is that positive and negative responses to job resources, respectively demands are relatively distinct or dual processes (e.g., Bakker & Demerouti 2007; Schaufeli & Bakker 2004). Accordingly, job resources evoke a motivational process, resulting in positive work-related states, such as engagement, satisfaction, and commitment. An effort-driven
health-impairment process is assumed to be triggered by job demands, which absorb psychological or physical energy. Continuous exertion of high efforts will eventually overtax a person’s regulation capacities, thus leading to job strain, burnout, and other manifestations of impaired psycho-physical health. To elaborate the theoretical foundation of the model, scholars have drawn on different frameworks, among others, self-determination theory (SDT; e.g., Van den Broek, Vansteenkiste, De Witte & Lens 2008). The present study tests core assumptions of the JDRM and SDT in a path model based on N = 1008 employees. Advancing the integration of both theories, it heeds calls for further validation studies of the JDRM (Bakker & Demerouti 2007) and a stronger reception of SDT in organizational research (Gagné & Deci 2005).

HYPOTHESES

Motivational Process

Task-related and contextual features determine the extent to which gainful work activities stimulate autonomous or “quasi-intrinsic” motivation (e.g., Gagné & Deci 2005; Humphrey, Nahrgang & Morgeson 2007). According to SDT, autonomous motivation is a function of the degree of fulfillment of basic psychological needs for autonomy, competence, and relatedness (Baard, Deci & Ryan 2004). The following three work characteristics should contribute to satisfaction of these needs: a) Job autonomy (i.e., discretion and freedom in how to carry out the work); b) learning opportunities (i.e., use of existing and acquisition of new knowledge and skills); and c) task interdependence (i.e., opportunities for work-related collaboration and social interaction). SDT
postulates that external goals can be psychologically integrated to various degrees. Autonomous or intrinsic work motivation has been suggested to facilitate the internalization of broader organizationally desired objectives and thus provide a basis for affective organizationally commitment (Gagné, Chemolli, Forest & Koestner 2008). Specifically, intrinsic motivation has been theorized to reflect a proximal or first-order outcome of work that supports autonomous regulation, whereas affective commitment is a more distal or second-order consequence (Gagné & Deci 2005). Building on this previous research, we specify a motivational process in response to job resources as follows:

**Hypothesis 1.** Job autonomy (H1a), learning opportunities (H1b), and task interdependence (H1c) will relate positively to intrinsic work motivation, which, in turn, will relate positively to affective organizational commitment (H1d).

**Health-Impairment Process**

The experience and consequences of work strain run the gamut from short-term negative cognitive and affective states to chronic and long-term symptoms of mental and physical ill-health (e.g., Danna & Griffin 1999; Mohr, Müller, Rigotti, Aycan & Tschan 2006; Parker, Turner & Griffin 2003). Job demands or stressors are conditions that are associated with psychological and/or physical effort and costs, hinder or obstruct the pursuit of work goals, and thus frustrate work-related psychological needs (e.g., Demerouti et al. 2001; Van den Broek et al. 2008). We focused on three types of stressors that match our set of motivating work characteristics in that they pose hindrances to the fulfillment of needs for autonomy, competence, and relatedness; these are: a) **Quantitative**
overload (i.e., external pressure to accomplish more work than feasible at a normal and sustainable pace); b) learning hindrances (i.e., obstacles or lack of opportunity for the use and acquisition of knowledge and skills); and c) information deficits (i.e., lack of information required from others to accomplish the work). Following the JDRM, we expect these demands to not primarily erode intrinsic motivation, but to trigger a relatively independent health-impairment process. According to classic postulates on the etiology of work-related health problems (e.g., Frese 1985; Mohr et al. 2006), cognitive and emotional work strain experienced in the short- to medium term, can progress to more severe and generalized psychosomatic symptoms in the longer run. Accordingly, we postulate the following health-impairment process in response to job demands:

Hypothesis 2. Quantitative overload (H1a), learning hindrances (H2b), and information deficits (H2c) will relate positively to psychological work strain, which, in turn, will relate positively to psychosomatic complaints (H1d).

Individual Autonomy Orientation

Individual differences, such as the need for control, generalized self-efficacy, dispositional optimism, and locus of control, play an established role in both motivational and stress-related processes (e.g., Cooper & Payne 1991; Deci & Ryan 2002; Solberg & Segerstrom 2006). SDT conceptualizes individual differences as general causality orientations. Autonomy-oriented individuals are predisposed to experiencing higher degrees of autonomous motivation (e.g., Lam & Gurland 2008). Tending to perceive social contexts as autonomy-supportive and their own actions as
self-determined, autonomy-oriented individuals are likely to adopt problem-focused and functional
coping patterns and are less prone to experiencing situations as stressful and beyond their scope of
influence (e.g., Folkman 1984). Integrating this core postulate of SDT, we propose that:

\[ \text{Hypothesis 3. Autonomy orientation will relate positively to intrinsic work motivation (H3a) and negatively to psychological work strain (H3b).} \]

Organizational Alienation

Alienation refers to the extent to which individuals are disengaged from their work roles
based on a lack of fulfillment of job-related personal needs and expectations (Hirschfeld & Feild
2000; Kanungo 1979). Organizational alienation can be understood as a negative form of attachment
to the work organization, characterized by negative affect and feelings of power- or helplessness; this
includes perceived inability to enact positive changes in the current employment relationship or seek
out alternative employment options (Hornung 2010; Penley & Gould 1988). Organizational alienation
is an amotivated and adverse psychological state, which can be conceptualized as a longer-term work
outcome at the intersection of motivational and health-impairment process; that is, resulting from
chronically low intrinsic motivation and high work strain (e.g., Banai & Reisel 2008). Individuals
high in autonomy orientation should experience lower alienation due to their tendency to feel and act
in charge of their working situation (e.g., De Man & Devisse 1987). As such, we suggest that:

\[ \text{Hypothesis 4. Intrinsic work motivation (H4a) and autonomy orientation (H4b) will relate negatively and psychological work strain positively (H4c) to organizational alienation.} \]
METHOD

Sample

Analyses are based on a sample of N = 1008 clerical workers in a public administration in Germany. Altogether 1510 surveys were distributed and collected via the organization’s mail delivery system (a response rate of 66.8%). Approximately one out of four participants were female (27.5%); mean age was 43.56 years (SD = 8.38); and 18.8% worked part-time below 40 hours per week.

Measures

Work characteristics. Six 4-item scales were drawn from a validated self-report instrument (Büssing & Glaser 2000). Three represent job resources: a) job autonomy (e.g., “This work offers discretion to decide how to get tasks done”; α = .67); b) learning opportunities (e.g., “This work provides opportunity to expand one’s theoretical knowledge”; α = .73); and c) task interdependence (e.g., “This work requires close cooperation with coworkers”; α = .71). Three scales tap stressful demands: d) quantitative overload (e.g., “Frequently, there is too much to do at once to complete one’s work”; α = .71); e) learning hindrances (e.g., “There is little opportunity to learn new working methods in this job”; α = .70); and d) information deficits (e.g., “Information needed to do the work is frequently not available”; α = .71). Unless indicated otherwise, measures in this study used a 5-point Likert scale from 1 = “Not at all” to 5 = “To a very great extent”.
**Intrinsic work motivation.** The widely used 6-item scale by Warr, Cook and Wall (1979) was used to measure the extent of autonomous motivation at work. A sample item is: “I feel a sense of personal satisfaction when I do my job well” ($\alpha = .73$).

**Affective commitment.** The 5-item scale of Penley and Gould’s (1998) Organizational Commitment Scale (OCS) operationalized affective commitment. A sample item is: It is my personal responsibility to help this organization achieve success” ($\alpha = .73$).

**Psychological work strain.** The 8-item irritation scale by Mohr et al. (2006) includes a cognitive strain component of ruminating thoughts (3 items; e.g., “Even at home I often think of my problems at work”) and an emotional component of affective irritability (5 items; e.g., “I get grumpy when others approach me”), which were combined as a composite measure ($\alpha = .89$).

**Psychosomatic complaints.** Psychosomatic symptoms were assessed with 28 items of the Freiburg Complaint List (Fahrenberg 1995), including five symptom classes: a) general condition; b) tiredness; c) gastrointestinal; d) cardiovascular; and e) musculoskeletal. Items were answered on a 5-point scale (1 = “Never” to 5 = “Almost every day”) and combined into one index ($\alpha = .93$).

**Autonomy orientation.** Individual orientations towards self-determination at work were measured with a 9-item scale of control aspiration (Frese, Garst & Fay 2007). A sample item is: “Work is more interesting when you can make a lot of decisions on your own” ($\alpha = .84$).

**Organizational alienation.** A 5-item scale from the OCS (Penley & Gould 1998) was used. A sample item is: “No matter what I do around here, this organization remains unchanged” ($\alpha = .73$).
RESULTS

Scale Analysis

Measures were subjected to Confirmatory Factor Analysis (AMOS 17.0). Model fit was assessed through: a) Incremental Fit Index (IFI) and b) Comparative Fit Index (CFI), both of which should be .90 or higher; c) Root Mean Square Error of Approximation (RMSEA), which should be below .08 (e.g., Brown 2006; Byrne 2001); and d) Hoelter’s Critical N (CN), the theoretical sample size for obtaining a non-significant chi-square, should be above 200 (e.g., Bollen & Liang 1988).

First, the 24 work characteristics items were analyzed. The theoretical 6-factor model had acceptable fit (see Table 1); alternative 1-, 2-, and 3-factor models were rejected. Next, a 5-factor model of employee responses was tested. Psychosomatic Complaints used the five symptom classes as manifest indicators, all other measures were analyzed on the item-level. Fit indices were satisfactory; alternative 1-, 2-, and 4-factor models were unacceptable. Lastly, a 1-factor model of autonomy orientation was established. Descriptive statistics and correlations are shown in Table 2.

[Insert Tables 1 and 2 about here]

Structural Model

Hypotheses were tested in a path model with manifest variables. Non-hypothesized paths were included to assess implied differential effects. The model is shown in Figure 1 and was supported in three ways: a) Fit indices suggest adequate match to the data ($\chi^2(19) = 139.03, p < .01$; IFI = .96; CFI = .96; RMSEA = .079; CN = 219); b) all hypothesized paths were significant ($p < .05$);
and c) all included non-hypothesized paths were non-significant (p > .05). Specifically, all three types of job resources related positively to Intrinsic Work Motivation (Job Autonomy: $\beta = .10$, $p < .01$; Learning Opportunities: $\beta = .09$, $p < .05$; Task Interdependence: $\beta = .09$, $p < .01$), providing support for H1a, H1b, and H1c. Additional effects of these constructs on Psychological Work Strain, were non-significant (Job Autonomy: $\beta = .06$, $p > .05$; Learning Opportunities: $\beta = -.03$, $p > .05$; Task Interdependence: $\beta = .00$, $p > .05$). For the three job demand variables this pattern was reversed. Corresponding with H2a, H2b, and H2c, positive associations were observed with Psychological Work Strain (Quantitative Overload: $\beta = .18$, $p < .01$; Learning Hindrances: $\beta = .17$, $p < .01$; Information Deficits: $\beta = .09$, $p < .05$), but no relationships with Intrinsic Work Motivation (Quantitative Overload: $\beta = .03$, $p > .05$; Learning Hindrances: $\beta = -.04$, $p > .05$; Information Deficits: $\beta = -.06$, $p > .05$). Intrinsic Work Motivation related positively to Affective Commitment ($\beta = .37$, $p < .01$), but was unrelated to Psychosomatic Complaints ($\beta = -.03$, $p > .05$). Conversely, Psychological Work Strain was strongly associated with Psychosomatic Complaints ($\beta = .56$, $p < .01$), but was unrelated to Affective Commitment ($\beta = -.05$, $p > .05$). Accordingly H1d and H2d were supported. As predicted in H3a and H3b, Autonomy Orientation related positively to Intrinsic Work Motivation ($\beta = .10$, $p < .01$) and negatively to Psychological Work Strain ($\beta = -.12$, $p < .01$). Additional paths from Autonomy Orientation on Affective Commitment ($\beta = .01$, $p > .05$) and Psychosomatic Complaints ($\beta = -.05$, $p > .05$) were not significant. Finally, H4a, H4b, and H4c were supported by negative effects
of Intrinsic Work Motivation ($\beta = -0.20$, $p < .01$) and Autonomy Orientation ($\beta = -0.14$, $p < .01$) as well as a positive effect of Psychological Work Strain ($\beta = 0.36$, $p < .01$) on Organizational Alienation.

DISCUSSION

The present study contributes to the growing literature on the JDRM, which postulates that intrinsic work motivation and job stress are dual psychological processes, triggered by distinct aspects of work content and context (Bakker & Demerouti 2007). Our results advance the empirical integration of the JDRM and SDT and thus demonstrate the utility of SDT to inform and enhance established models of organizational behavior (Gagné & Deci 2005). Motivating work characteristics of job autonomy, learning opportunities, and task interdependence were selected based on SDT’s postulate that intrinsic motivation is based on the extent to which activities permit satisfaction of psychological needs for autonomy, competence, and relatedness (Baard et al. 2004). Selected work stressors of quantitative overload, learning hindrances, and information deficits match these three domains in that they pose obstacles to the fulfillment of the respective needs. The clear differential pattern of associations between these job resources and demands and employee reports of intrinsic work motivation and psychological work strain support core assumptions of both JDRM and SDT. Moreover, the assumption that resources and demands trigger a motivational, respectively health impairment process is rarely reflected in studies on the JDRM, which have mainly focused on two outcomes – work engagement and job burnout (Bakker & Demerouti 2007). Using an alternative set
of proximal and distal employee responses, this study has explicitly modeled these dual processes. In line with SDT’s psychological integration perspective, our findings suggest that job resources evoke intrinsic work motivation, which, in turn, forms a basis for affective commitment, that is, identification with the organization and internalization of its values and goals (Gagné et al. 2008).

Concurrently, stressful job demands have been shown to be more proximal to short- to medium term responses of psychological work strain, which, in turn, can progress to more severe and generalized symptoms of psychosomatic health impairment (Frese 1985; Mohr et al. 2006). In addition to validating assumptions on the relative distinctness of motivational and health-impairment process, the model also suggests that certain employee responses may be reside at their intersection. Organizational alienation, an amotivated and aversive state of powerlessness and negative affect, appears to develop as a result of chronically low intrinsic motivation and high psychological work strain. Finally, the model also supports the role that SDT ascribes to individual differences in causality orientations (Lam & Gurland 2008). Autonomy orientation, operationalized as the extent to which employees aspire to take control at work and carry out tasks in a self-determined fashion, had positive effects on intrinsic work motivation and decreased the likelihood of psychological strain and alienation.

Limitations are the single-source and cross-sectional nature of our data. If problems of common method variance are indeed as severe as frequently assumed, however, remains an ongoing controversy (e.g., Conway & Lance 2010). Nonetheless, the data only provide a snapshot of the underlying processes as opposed to longitudinal design with multiple measurement points. Our study
focused on core assumptions of the JDRM and SDT; other postulates of both theories, such as interactive effects of job demands and resources in the JDRM or the role of managerial autonomy support in SDT, were not tested. Scales used to measure intrinsic work motivation and autonomy orientation are well established, yet their empirical convergence with measures developed by SDT scholars remains untested. Some effects were fairly small in size, which may be attributable to range restrictions in our sample, which only included employees from one organization doing similar work.

Our study has several practical implications for managing worker well-being and performance. The primary measure to lessen job strain and its negative impact on worker health should be seen in a reduction of stressful work characteristics. To promote intrinsic motivation and organizational commitment, providing opportunities to experience autonomy, competence, and relatedness at work appears to be most crucial. Due to individual differences in autonomy orientation, however, a one-size-fits-all approach to work design may fail to produce optimal results. Employees with lower autonomy orientation may need more supportive conditions to maintain personal well-being and stay engaged in their work. Over time, exposure to autonomous and challenging job tasks, however, may also increase aspirations to take control and show initiative at work through processes of occupational socialization (e.g., Frese et al. 2007). The costs of poorly designed jobs, on the other hand, may manifest in employees who are disengaged from their work and alienated from the organization.

To conclude, jointly applying the predictions of the JDRM and SDT as work design principles appears to be a promising approach to maximize positive and minimize negative work outcomes.
REFERENCES


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Figure 1: Structural Path Model

Note. N = 1008; **p < .01, *p < .05; standardized parameter estimates (β-weights); correlations between independent variables and the following non-significant paths are not displayed:
a) From Job Autonomy (β = .06, p > .05), Learning Opportunities (β = -.03, p > .05), and Task Interdependence (β = .00, p > .05) on Psychological Work Strain;
b) From Quantitative Overload (β = .03, p > .05), Learning Hindrances (β = -.04, p > .05), and Information Deficits (β = -.06, p > .05) on Intrinsic Work Motivation;
c) From Intrinsic Work Motivation (β = -.03, p > .05) on Psychosomatic Complaints;
d) From Psychological Work Strain (β = -.05, p > .05) on Affective Commitment;
e) From Autonomy Orientation on Affective Commitment (β = .01, p > .05) and Psychosomatic Complaints (β = -.05, p > .05).
Table 1: Fit Indices for Confirmatory Factor Analyses and Path Model

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Note. N = 1008; $\chi^2 =$ chi-square discrepancy (all p < .01); df = degrees of freedom; IFI = Incremental Fit Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; CN = Hoelter’s Critical N;

aFactor 1: Job Autonomy, Learning Opportunities, and Task Interdependence; Factor 2: Quantitative Overload, Learning Hindrances, and Information Deficits;
bFactor 1: Job Autonomy and Quantitative Overload; Factor 2: Learning Opportunities and Learning Hindrances; Factor 3: Task Interdependence and Information Deficits;
cFactor 1: Intrinsic Work Motivation and Affective Commitment; Factor 2: Psychological Work Strain, Psychosomatic Complaints, and Organizational Alienation;
dCombined into one factor: Psychological Work Strain and Psychosomatic Complaints;
eCombined into one factor: Intrinsic Work Motivation and Affective Commitment;
fCombined into one factor: Intrinsic Work Motivation and Psychological Work Strain;
gCombined into one factor: Affective Commitment and Organizational Alienation
Table 2: Descriptive Statistics and Correlations

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Note. N = 1008; **p < .01, *p < .05.