

# Task flexibility through individualized work redesign – Probing a three-pronged approach

Severin Hornung,\* Thomas Höge\* & Denise M. Rousseau\*\*

\* University of Innsbruck, Institute of Psychology

\*\* Carnegie Mellon University, Pittsburgh, USA

## ABSTRACT

This study investigates three individual-level aspects of work flexibility, a) active use of task autonomy, b) self-initiated job crafting, and c) negotiation of task-related idiosyncratic deals (i-deals) authorized by superiors. It tests their interaction in predicting individual self-reported quality of working life and occupational health using a survey of 279 German-speaking workers. Psychometrically robust 4-item scales operationalized task-focused autonomy, crafting, and i-deals. Moderated linear regressions, controlling for gender, age, and additional work characteristics, assessed the main and interaction effects of these three aspects of work flexibility on indicators of the quality of working life, including positive work-related states, work-home interactions, and health-impairment. Task autonomy was consistently associated with beneficial effects, while i-deals related to some but not all positive indicators. Effects of task crafting were mostly spurious, except from an unexpected adverse relationship with work-home conflict. In contrast, 2-way interactions of i-deals and crafting indicated positive effects on four outcomes while 3-way interactions were found for three outcomes – affective commitment, meaning of work, and work-home enrichment. Results suggest synergy between task i-deals and crafting, especially under conditions of high autonomy, with positive interaction effects on favorable work-related experiences and states.

## Keywords

Work design – job crafting – idiosyncratic deals – control at work – quality of working life – stress and health – interaction effects

The exercise of individual control and influence is core to the psychological effects of work and organizational design (Langfred & Moye, 2004; Sauter, Hurrell & Cooper, 1989; Spector, 1986). The present study conceptualizes task-related („functional“) workplace flexibility (hence „task flexibility“) in terms of its potential role in personal agency and self-determination. It identifies three ways in which individuals exercise control over their work tasks: top-down, bottom-up, and hybrid processes (Parker, van den Broeck & Holman, 2017). Top-down processes create task flexibility by designing jobs that provide individuals with opportunities to exercise autonomy in their daily work activities (Hackman & Oldham, 1980; cf. Morgeson & Humphrey, 2006). Task flexibility also can be realized through bottom-up or emergent job crafting, where individuals proactively alter their work to make it more personally rewarding, meaningful, or less stressful (Wrzesniewski & Dutton, 2001; cf. Tims & Bakker, 2010). Lastly, individuals can

attain task flexibility by negotiating with their employer or its agents to alter their tasks and other working conditions, a hybrid or mixed-level process that combines personal agency with employer approval (Hornung, Rousseau, Glaser, Angerer & Weigl, 2010; Rousseau, 2005). The present study investigates the main and interaction effects of these three modes of task flexibility on employee outcomes. Thus our research contributes to the body of work that Grant and Parker (2009) termed „proactive and relational“ perspectives in work design. It does so by examining job autonomy, i-deals and job crafting concurrently. Despite integrative theoretical reviews, empirical studies have treated these modes of influence separately (for meta-analytic reviews see Rudolph, Katz, Lavigne & Zacher, 2017 and Liao, Wayne & Rousseau, 2016). Seeking to integrate research on task flexibility, we first test whether task crafting and task i-deals are empirically distinct both from each other and from the task autonomy in-

herent in the job. Second, we examine the simultaneous and joint effects of these modes of attaining task flexibility. Although main effects have been examined for a range of positive work outcomes (e.g., job performance, positive attitudes) for i-deals (Liao et al., 2016), job crafting (Rudolph et al., 2017), and task autonomy (Langfred & Moye, 2004), their simultaneous or joint effects are rarely examined. A notable exception, Rofcanin, Berber, Koch, and Sevinc (2016) have compared the effects of i-deals and job crafting on self-reported performance and job attitudes, concluding that i-deals were more relevant for eliciting positive employee responses than job crafting. Our study extends this line of research by being the first to examine not only the simultaneous (additive), but also joint (interactive) effects of task i-deals and crafting—in conjunction with the level of autonomy afforded by the job itself. Our study builds on Hornung et al. (2010), who introduced i-deals to the work design literature. It goes beyond this earlier work by a) including an empirical measure of job crafting; b) focusing on interactive effects; and c) investigating a broader range of outcomes related to both positive and negative work experiences. This approach reconnects this study with earlier research investigating i-deals in the context of organizational efforts to increase the quality of working life through employee-oriented forms of workplace flexibility, such as home-based teleworking (Hornung, Rousseau & Glaser, 2008). Thus, we extend research on individualized work redesign by investigating interactions among job autonomy and employee-initiated (negotiated and unauthorized) task changes.

### A three-pronged approach to work redesign

#### *Top-down processes: Task autonomy*

Organizational human resource management practices, programs, and interventions can enhance the freedom employees have to personalize their work tasks, a change often introduced „top-down“ by the employer (Nielsen, Nielsen, Ogbonnaya, Känsälä, Saari & Isaksson, 2017; Parker, 2014; Parker et al., 2017). A key and widely studied aspect of top-down work design is job (or sometimes „task“) autonomy, the degree of freedom or discretion in making task-related decisions (e.g., setting work goals, determining and scheduling work processes; Langfred & Moye, 2004; Morgeson & Humphrey, 2006). Autonomy as an attribute of an individual’s job has been the target of numerous planned change interventions (e.g., Hackman & Oldham, 1980). Consistently, autonomy is positively related to employee job satisfaction, retention and quality of performance (Nielsen et al., 2017; Ng & Feldman, 2015; Parker, 2014). To become psychologically acti-

vated, the autonomy a job provides must be experienced and actively used by workers (Langfred & Moye, 2004). The potential for autonomy in a job thus can be constrained by both personal predispositions such as low self-efficacy (Ng & Feldman, 2015) and external hindrances such as work overload (Jimmieson, 2000; Laurence, Fried & Raub, 2016). As such, this top-down mode of attaining task flexibility both presumes and requires active use of the opportunities the employer provides employees for exercising autonomy within (more or less) specified boundaries.

#### *Bottom-up processes: Task crafting*

At the other end of the spectrum are „bottom-up“ job changes that employees make on their own. Job crafting refers to as „the physical and cognitive changes individuals make in the task or relational boundaries of their work“ (Wrzesniewski & Dutton, 2001, p. 179). Three domains of job crafting have been identified: Self-initiated changes in a job’s tasks (e.g., number, scope, and type), cognitive adjustments in worker responses to the job (e.g., work-related attitudes, beliefs, and perceptions), and shifts in relational boundaries (e.g., quality or quantity of social interactions at work). The construct of job crafting builds on and integrates earlier research on work roles, proactive behavior, and organizational socialization (Black & Ashford, 1995; Fried, Grant, Levi, Hadani & Slowik, 2007; Ilgen & Hollenbeck 1991). Its premise is that workers are active co-creators of their work situation and not passive job recipients. Job crafting refers to actions individuals engage in on their own initiative without formal authorization in order to modify their jobs in personally meaningful ways (Demerouti, 2014). The task flexibility that results from job crafting creates individual variability in job features due to differences in job duties and role-related understandings. Some scholars have taken an alternative view of job crafting, developing theory regarding the ways in which employees influence their own work characteristics. Tims, Bakker and Derks (2012, p. 174) interpret crafting from the perspective of the job demands-resources model of work design as changes employees enact to „balance their job demands and job resources with their personal abilities and needs“. This alternative view explicitly focuses on actions workers take to increase structural resources such as autonomy and social support, to seek out personally interesting or challenging assignments, or to avoid stressful tasks or interactions. Although job crafting may involve all of these, the reinterpretation of the construct according to the job demands-resources model considerably narrows its more open initial conceptualization (Demerouti, 2014; Hornung, 2017). Job crafting has become accepted in work design because of the positive benefits of worker

self-expression for both worker and employer. However, in practice, unauthorized changes in tasks are only legitimate within the limits of the employer's „zone of indifference“ (e.g., performance standards, compensation levels). For instance, task crafting may be triggered by circumstances that necessitate self-initiated reductions in workload, performance or quality – overall, or in a certain domain of the job. Eventually, this may put workers into a situation of deviance outside the conventional „zone of indifference“, where the individual's exercise of task-related job crafting is tacitly accepted by the employer. In such instances, employees may protect themselves from sanctions by seeking out *i-deals* for reduced hours or job duties to legitimize self-work redesign.

### *Hybrid processes: Task i-deals*

Idiosyncratic deals (*i-deals*) are non-standard work and employment conditions negotiated between individual employees and agents of the employer, such as managers or HR representatives (Rousseau 2005; Rousseau, Tomprou & Simosi, 2016). The content of these personalized arrangements is diverse and can include flexible scheduling, special duties and development opportunities among others (Hornung et al., 2018). As authorized differential treatment among workers in the same job, *i-deals* are both approved by the employer and intended to benefit the individual and the organization (Rousseau et al., 2016). *I-deals* can be differentiated from dysfunctional arrangements, such as favoritism, cronyism, or preferential treatment, assuming those *i-deals* are negotiated in a fashion consistent with principles of procedural and distributive justice (Hornung, Doenz & Glaser, 2016; Rousseau, 2005; Rousseau, Ho & Greenberg, 2006). Illegitimate sources of task flexibility such as rule-breaking or favoritism undermine procedural and distributive justice to the detriment of broader organizational interests (e.g., employee satisfaction and trust). In general, task-related *i-deals* have positive effects on both work motivation and occupational wellbeing. The initial study by Hornung et al. (2010) showed in two samples that task *i-deals* negotiated under conditions of high leader-member exchange were associated with positive evaluations of work characteristics, specifically, job control, complexity, and stressors. These work characteristics, in turn, mediated the relationship of task *i-deals* with both performance and well-being. Another study found cross-sectional and longitudinal evidence that job autonomy mediated the relationship of (general) *i-deals* with job satisfaction; a third study found autonomy to mediate the relationship of task *i-deals* with job performance (for an overview, see Hornung et al., 2018). *I-deals* thus appear to play an important role in individualized work design.

### **Hypotheses**

These three modes for attaining flexibility differ in important ways from other forms of employee initiative, such as the autonomous actions employees undertake to affect change in the work setting in the form of taking charge or workplace proactivity (Grant & Ashford, 2008; Parker & Collins, 2010). The latter are forms of active performance aimed at promoting organizational efficiency or effectiveness (e.g., making suggestions or implementing improvements). In contrast the three modes of task flexibility target changes in the individual's job. Our first research question addresses the construct validity of the three distinct forms of task flexibility: Are task-related autonomy, job crafting, and *i-deals* empirically distinct. Their inter-relationships are undertheorized and seldom studied (e.g., Fried et al., 2007; Hornung, 2017; Rofcanin et al., 2016), raising the possibility of heretofore unrecognized complexity in their connections to each other. Previous research treats autonomy, in the form of job authority, personal discretion, and lack of structural restriction, as a necessary condition for job crafting. For instance, Wrzesniewski and Dutton (2001, p. 184) suggest that „autonomy in the job leads to perceived opportunities for job crafting and encourages employees to alter the task and relational boundaries of their jobs“. Autonomy thus can be construed as an antecedent of self-enacted job changes. At the same time, expanded job autonomy can also be a consequence of individual negotiation and job crafting – particularly when they lead to changes in the tasks individuals perform (Liao et al., 2016; Rudolph et al., 2017). A more dynamic view of job crafting frames it as a form of self-empowerment, which gives rise to increased perceptions of autonomy, triggering „gain spirals“ of active wellbeing and performance (Weigl, Hornung, Parker, Petru, Glaser & Angerer, 2010; cf. Hornung, 2017). Job autonomy thus can simultaneously function in several ways in the context of task flexibility: Antecedent, content, outcome, and moderating factor. In line with these results, we posit that reciprocal dynamics exist among our three modes of task flexibility, resulting in complex interactions among them (Frese, Garst & Fay, 2007). Although frequently discussed on a theoretical level, the connections and distinctive features of *i-deals* and job crafting are rarely empirically investigated in the same study. The present study focuses on the dimension of work tasks, which is a specific and shared core dimension of both job crafting and *i-deals*. In addition, task autonomy, a core dimension of work design, was included to operationalize top-down, bottom-up and hybrid processes in a parallel form (Hornung et al., 2010). By focusing on the single dimension of work tasks, this study reduces the complexity of jointly considering autonomy, *i-deals* and job crafting. We identify and em-

ploy three distinct scales to assess these three forms of task flexibility and propose the following hypothesis:

*Hypothesis 1:* Task autonomy, task crafting, and task i-deals are empirically distinct.

Our second research question concerns the nature of the relationship these three forms of task flexibility have with quality of working life. Quality of working life refers an area of positive conceptualizations of the individual work experience, including favorable job attitudes, intrinsic work motivation, fulfilment of work-related needs, and absence of threats to well-being (Grote & Guest, 2017). To comprehensively assess the impact of these forms of flexibility, we use seven scales, reflecting three broader categories of positive work experiences (meaning of work, affective commitment, well-being), work-home interaction (conflict, enrichment), and occupational health (emotional exhaustion, psychosomatic complaints). Our second hypothesis is that task autonomy, task crafting and task i-deals each independently relate to indicators of quality of working life.

*Hypothesis 2:* Task autonomy (H2a), task crafting (H2b), and task i-deals (H2c) are related to indicators of individual quality of working life.

Beyond these direct effects, aforementioned studies suggest that the dynamics among these modes may be interactive (mutually influencing) rather than parallel (independent) or serial (mediation). Indeed, research on proactive behavior suggests that different forms of task flexibility offer synergistic (i.e., mutually reinforcing) pathways towards improvement in person-environment fit (e.g., Grant & Ashford, 2008; Grant & Parker, 2009; Parker & Collins, 2010). Drawing on insights of interactional psychology, regarding the complex, reciprocal and iterative dynamic processes of mutual influence between individuals and their environment (Terborg, 1981), we hypothesize interactions among the three modes of task flexibility in their relationship with quality of working life.

*Hypothesis 3:* Synergistic effects are associated with the joint occurrence of task autonomy, task crafting, and task i-deals, such that 3-way interactions of these three constructs explain additional variance in indicators of quality of working life.

## Method

### Sample

Survey data were gathered by students participating in a university research seminar conducted by the second author. Students recruited participants

through personal contacts and distributed hard-copy questionnaires. The seminar lecturer, the second author, oversaw data input, integration, and quality assessment. Useable questionnaires were obtained from  $N = 279$  German-speaking employees. Their work settings ranged from education, healthcare, and customer service; occupations included clerical, technical, managerial, and creative professions. Data quality was found to be satisfactory with plausible and differentiated responses and few missing values ( $< 5\%$ ). Over half of the sample were women (59%); mean age was  $M = 35.7$  years ( $SD = 11.6$ ); more than a third (36%) reported a college degree; slightly fewer (30%) held supervisory roles; most (84.2%) had an open-ended full-time work contract with an average of  $M = 35.5$  ( $SD = 8.7$ ) contracted hours per week (reported actual work hours:  $M = 39.0$ ,  $SD = 10.0$ ). With a mean duration of  $M = 8.9$  years, employment was long-term though variation was substantial ( $SD = 9.3$ ). In sum, our sample reflects a cross-section of younger more highly qualified workers, suitable to the study's purpose.

### Measures

Categorical and numerical items obtained demographic information. Multi-item scales assessed 12 constructs: Three core constructs of work self-redesign, three work characteristics as controls, and seven quality of working life outcomes. Response options ranged from 4-point to 6-point scales (see Table 1 for measurement details and descriptive statistics).

*Work self-redesign.* The three components of work self-redesign were each measured with four items developed in previous research. Task autonomy (TAU;  $\alpha[4] = .81$ ) used the action latitude scale of the work analysis instrument by Semmer, Zapf and Duncel (1995). Task crafting (TCR;  $\alpha[4] = .89$ ) used a scale developed by Hornung (2017). Task i-deals (TID;  $\alpha[4] = .88$ ) employed measures by Hornung et al. (2010). Items and factor analyses supporting this three-dimensional taxonomy are reported below and in Table 2.

*Work characteristics.* Three work characteristics were included as control variables. Task complexity (TCO;  $\alpha[3] = .78$ ), task interdependence (TIN;  $\alpha[4] = .81$ ), and task overload (TOV;  $\alpha[2] = .79$ ) were measured with items from established work analysis instruments (cf. Morgeson & Humphrey, 2006). Exploratory and confirmatory analyses support their dimensionality. Initiated and received task interdependence (2 items each) were combined into a composite measure.

*Quality of working life.* Quality of working life was assessed using seven indicators reflecting three categories of positive work experiences (affective commitment, meaning of work, wellbeing), work-home interaction (conflict, enrichment), and impaired occu-

Table 1: Study constructs, measurement, and descriptive statistics.

	Label	Items	Scale	<i>M</i>	<i>SD</i>	$\alpha$
<b>Core constructs: Work self-redesign</b>						
Task autonomy	TAU	4	1-5 <sup>1</sup>	3.62	0.84	.81
Task crafting	TCR	4	1-5 <sup>2</sup>	2.95	0.96	.89
Task i-deals	TID	4	1-5 <sup>2</sup>	2.81	1.09	.88
<b>Control variables: Work characteristics</b>						
Task complexity	TCO	5	1-5 <sup>3</sup>	2.82	0.98	.78
Task interdependence	TIN	4	1-5 <sup>3</sup>	4.08	0.81	.81
Task overload	TOV	2	1-5 <sup>3</sup>	3.10	0.95	.79
<b>Outcomes: Quality of working life</b>						
<i>Positive work experiences</i>						
- Meaning of work	MOW	6	1-6 <sup>4</sup>	4.38	1.18	.88
- Affective commitment	COM	5	1-5 <sup>3</sup>	3.57	1.06	.94
- Wellbeing	WLB	5	1-6 <sup>5</sup>	3.90	0.95	.87
<i>Work-home interaction</i>						
- Work-home enrichment	WHE	4	1-4 <sup>6</sup>	1.86	0.67	.78
- Work-home conflict	WHC	6	1-4 <sup>6</sup>	1.82	0.54	.83
<i>Impaired occupational health</i>						
- Emotional exhaustion	EXH	5	1-6 <sup>7</sup>	3.06	1.11	.90
- Psychosomatic complaints	PSC	12	1-6 <sup>7</sup>	2.35	0.81	.86

Note: *N* = 279; *M* = Mean, *SD* = Standard Deviation; response format: <sup>1</sup>1 = „very little“ to 5 = „very much“; <sup>2</sup>1 = „not at all“ to 5 = „to a very great extent“; <sup>3</sup>1 = „completely disagree“ to 5 = „completely agree“; <sup>4</sup>1 = „strongly disagree“ to 6 = „strongly agree“; <sup>5</sup>1 = „all of the time“ to 6 = „at no time“; <sup>6</sup>1 = „never“ to 4 = „always“; <sup>7</sup>1 = „never“ to 6 = „very often“.

ational health (emotional exhaustion, psychosomatic complaints).

*Positive work experiences.* Understood broadly here, positive work experiences, attitudes, or states included meaning of work, affective commitment, and general wellbeing. A 6-item scale of meaning in work (MOW;  $\alpha[6] = .94$ ) was based on a validated broader meaning and purpose in life measure (Schnell, 2009; Schnell, Höge & Pollet, 2015). Affective commitment (COM;  $\alpha[5] = .88$ ) was measured with Meyer and Allen's (1990) 5-item scale. General psychosocial wellbeing (WLB;  $\alpha[5] = .87$ ) was assessed with the extensively validated 5-item instrument from the World Health Organization (WHO-5, Bech, 2004).

*Work-home interaction.* Bi-directional spillover between work and private life was measured with scales on positive and negative work-home interaction (Geurts, Taris, Kompier, Dikkers, van Hooff & Kinnunen, 2005). To increase compatibility with previous research, we used the role-theory-based labels of work-home enrichment (WHE;  $\alpha[4] = .78$ ) and conflict

(WHC;  $\alpha[6] = .85$ ). Based on preliminary analyses, the number of items was reduced (from 5 to 4 for WHE and from 8 to 6 for WHC) to obtain a clearer factor structure.

*Impaired occupational health.* We used indicators of emotional exhaustion, the core component of job burnout, and psychosomatic symptoms, tapping a longer-term outcome of work stress. Emotional exhaustion (EXH;  $\alpha[5] = .90$ ) was based on the 5-item subscale from the „Maslach Burnout Inventory General Survey“ (Maslach, Jackson & Leiter, 1996). Psychosomatic complaints (PSC;  $\alpha[12] = .86$ ) were assessed with a 12-item scale drawn from the „Occupational Stress Indicator“ by Cooper and Williams (1991).

## Results

Psychometric properties of our three core variables were established in exploratory and confirmatory factor analyses (EFA, CFA). Task autonomy, task i-

Table 2: Factor structure of items measuring core constructs.

	1	2	3
<b>1. Task i-deals</b>			
a) Work tasks that suit my personal interests. (Arbeitsaufgaben, die meinen persönlichen Interessen entsprechen.)	.86 (.85)	.15	.18
b) Work tasks that fit my strengths and talents. (Arbeitsaufgaben, die meinen Stärken und Begabungen entsprechen.)	.86 (.86)	.21	.15
c) Work tasks specially customized for me. (Auf mich speziell zugeschnittene Arbeitsaufgaben.)	.82 (.78)	.22	.05
d) Work tasks corresponding with my individual skill sets. (Auf meine individuellen Fähigkeiten abgestimmte Arbeitsaufgaben.)	.80 (.74)	.16	.12
<b>2. Task crafting</b>			
a) Altered the composition of work tasks; e.g., by devoting extra time and effort to tasks you are passionate about. (Die Zusammensetzung von Arbeitsaufgaben abgeändert; z. B. zusätzliche Zeit und Anstrengungen in Aufgaben investiert, die Ihnen persönlich am Herzen liegen.)	.20	.85 (.85)	.17
b) Changed the number of tasks associated with your job; e.g., by taking over additional tasks and / or dropping unproductive or unnecessary ones. (Die Anzahl von Arbeitsaufgaben abgeändert, z. B. zusätzliche Aufgaben übernommen und/oder unproduktive oder unnötige Aufgaben eingestellt.)	.15	.84 (.82)	.17
c) Crafted personally desirable changes to the scope or nature of work tasks associated with your job. (Persönlich wünschenswerte Änderungen an Umfang oder Inhalten von Arbeitsaufgaben vorgenommen.)	.25	.83 (.84)	.17
d) Altered the scope or nature of work tasks to make better use of your personal strengths and skills. (Umfang oder Inhalte von Arbeitsaufgaben abgeändert, damit sie besser Ihren persönlichen Stärken und Fähigkeiten zu entsprechen.)	.18	.77 (.76)	.24
<b>3. Task autonomy</b>			
a) Overall, how much opportunities for making own decisions does your work offer? (Wenn man Ihre Arbeit insgesamt betrachtet, wieviel Möglichkeiten zu eigenen Entscheidungen bietet Ihnen Ihre Arbeit?)	.14	.16	.82 (.80)
b) Are you free to determine for yourself, the ways you go about doing your work? (Können Sie selbst bestimmen, auf welche Art und Weise Sie Ihre Arbeit erledigen?)	.07	.15	.82 (.75)
c) In your daily work activities, to what extent are you free to decide on the sequence of work steps by yourself (Wenn Sie Ihre Tätigkeit insgesamt betrachten, inwieweit können Sie die Reihenfolge der Arbeitsschritte selbst festlegen?)	.12	.16	.77 (.71)
d) How much influence do you have over what type of work you get assigned to? (Wieviel Einfluss haben Sie darauf, welche Arbeit ihnen zugeteilt wird?)	.10	.25	.70 (.65)
<b>Factor statistics</b>			
Initial eigenvalues	5.14	1.94	1.51
Variance explained (%)	42.86	16.19	12.61
Internal consistency (Cronbach's alpha)	.88	.89	.81

Note: Exploratory Factor Analysis (EFA), principle components, varimax rotation with Kaiser normalization; 5 iterations, cumulative variance explained: 71.66 %; Confirmatory Factor Analysis (CFA) loadings in parentheses; CFA fit indices:  $\chi^2 = 51.26$ ,  $df = 51$ ,  $ns$  ( $p = .464$ ),  $\chi^2/df = 1.01$ ; Incremental Fit Index (IFI) = 1.00, Tucker Lewis Index (TLI) = 1.00, Comparative Fit Index (CFI) = 1.00; Root Mean Square Error of Approximation (RMSEA) = .004; 90 % Confidence Interval (CI) = [.000-.039],  $ns$  ( $p = .995$ ).

deals, and task crafting were initially measured with 5 items each, the psychometrically weakest of which was dropped. Results are reported in Table 2, along with full item wordings. Fit indices of the final 3-factor CFA model (4 items each) fully supported H1. The chi-square discrepancy was non-significant ( $\chi^2 = 51.26$ ,  $df = 51$ , ns,  $\chi^2/df = 1.01$ ). Incremental Fit Index [IFI  $\approx 1.00$ ], Tucker Lewis Index [TLI  $\approx 1.00$ ], and Comparative Fit Index [CFI  $\approx 1.00$ ] all converged towards optimal values of 1.00. The Root Mean Square Error of Approximation [RMSEA = .004] was close to zero with a narrow 90 % Confidence Interval [CI = .000-.039] and a non-significant likelihood ( $p_{\text{close}} = .995$ ) of a population value  $< .050$ . Further, this measurement model vastly outperformed alternative 2-factor and 1-factor models. Intercorrelations between latent construct factors were:  $r = .47$  for autonomy and crafting;  $r = .36$  for autonomy and i-deals; and  $r = .48$  for i-deals and crafting (all  $p < .01$ ). Overall, these results indicate empirical distinctiveness and substantial unique variance of our core constructs.

Next, zero-order correlations with quality of working life indicators were examined (Table 3). Only task autonomy related to all in the expected direction (from  $r = .14$ ,  $p < .05$  for WHE to  $r = .41$ ,  $p < .01$  for MOW; from  $r = -.15$ ,  $p < .05$  for WHC to  $r = -.24$ ,  $p < .01$  for EXH). Task crafting related to positive constructs (from  $r = .18$ ,  $p < .01$  for COM and WHE to  $r = .25$ ,  $p < .01$  for MOW), but also had a positive association with work-home conflict ( $r = .18$ ,  $p < .01$ ), and was unrelated to occupational health. Task i-deals correlated only with positive indicators (from  $r = .18$ ,  $p < .01$  for WLB to  $r = .42$ ,  $p < .01$  for MOW), but not with work-home conflict, exhaustion, or psychosomatic complaints. Thus, while some evidence for all parts of H2 was found, preliminary support for H2a was stronger than for H2b and H2c.

In the third step, main and interactive effects of the three modes of task flexibility were tested in seven regression models for the quality of working life outcomes (Table 4). Controls (gender, age, task complexity, interdependence, and overload) were entered first. Next, main effects of task autonomy, crafting, and i-deals were included. Subsequent steps tested the three 2-way and one 3-way interaction terms of our core constructs. All models explained significant ( $p < .01$ ) variance in the respective outcomes ( $R^2$  ranging from 11 % for WHE to 36 % for MOW). Controlled and concurrent testing of main effects of core constructs provides a more rigorous assessment of H2. The highest level of support was again found for task autonomy (H2a) with beneficial effects for the majority (5 out of 7) of outcomes (MOW:  $\beta = .15$ ,  $p < .05$ ; WLB:  $\beta = .19$ ,  $p < .01$ ; WHC:  $\beta = -.15$ ,  $p < .05$ ; EXH:  $\beta = -.25$ ,  $p < .01$ ; PSC:  $\beta = -.24$ ,  $p < .01$ ). Task i-deals (H2b) related only to a subset of positive indicators, specifically, mean-

ing at work ( $\beta = .25$ ,  $p < .01$ ), affective commitment ( $\beta = .14$ ,  $p < .05$ ), and work-home enrichment ( $\beta = .16$ ,  $p < .05$ ). Most inconsistent was task crafting (H2c), which had no beneficial main effects, but instead was an antecedent to work-home conflict ( $\beta = .18$ ,  $p < .01$ ). Positive 3-way interactions (H3) occurred for 3 out of 7 outcomes: Meaning of work ( $\beta = .17$ ,  $p < .05$ ), affective commitment ( $\beta = .19$ ,  $p < .05$ ), and work-home enrichment ( $\beta = .20$ ,  $p < .05$ ), all suggesting synergistic beneficial consequences of the combination of task autonomy, crafting, and i-deals. This pattern of 3-way interactions provides partial support for Hypothesis 3, providing evidence of the interplay between these three modes of task flexibility in relation to an individual's quality of working life. We plotted the significant interaction effects, which supported our interpretations. Additionally, four 2-way interactions between i-deals and crafting were found, such that these two modes interacted positively, jointly boosting commitment and wellbeing ( $\beta = .14/.13$ ,  $p < .05$ ), and negatively, in buffering emotional exhaustion and psychosomatic complaints ( $\beta = -.12/-.16$ ,  $p < .05$ ). Although we did not develop specific hypotheses regarding two-way interactions, these findings further support synergistic effects, in particular, regarding the complementarity of i-deals and job crafting as two forms of proactive influence. No significant 2-way interactions occurred with task autonomy, suggesting different mechanisms with regard to task-inherent degrees of freedom.

Control variables had a number of effects. Gender and age effects were found in four models: women experienced less work-home enrichment and more psychosomatic complaints ( $\beta = -.13/.25$ ,  $p < .05/.01$ ); older participants reported higher meaning and wellbeing ( $\beta = .14/.19$ ,  $p < .01$ ). Task interdependence had no effect while complexity was associated with higher meaning and affective commitment ( $\beta = .19/.13$ ,  $p < .01/.05$ ). Task overload related negatively to meaning and wellbeing ( $\beta = -.15/-.19$ ,  $p < .01$ ) and positively to work-home conflict, emotional exhaustion, and psychosomatic complaints ( $\beta = .50/.48/.17$ , all  $p < .01$ ). Notably, this is an inverse pattern compared to task autonomy, affirming that task-related pressure and control function as antipodes. To further probe our findings, regressions were repeated without inclusion of control variables, demonstrating stable results.

Table 3: Zero-order correlation matrix.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Gender (0/1 for ♂/♀)	--													
2. Age (years)	-.10	--												
3. Task complexity	-.17**	-.07	--											
4. Task interdependence	-.18**	.21**	.06	--										
5. Task overload	-.09	.09	.27**	.24**	--									
6. Task autonomy	-.15*	.07	-.07	.27**	-.09	--								
7. Task crafting	-.07	.09	.11	.20**	.15*	.42**	--							
8. Task i-deals	-.01	.01	-.05	.25**	-.05	.51**	.45**	--						
9. Meaning of work	-.11	.21**	-.11	.54**	-.14*	.41**	.25**	.42**	--					
10. Affective commitment	-.07	.10	-.10	.24**	-.11	.51**	.18**	.53**	.68**	--				
11. Wellbeing	-.05	.20**	-.02	.09	-.17**	.27**	.19**	.18**	.47**	.52**	--			
12. Work-home enrichment	-.14*	.10	.00	.08	-.05	.14*	.18**	.24**	.22**	.17**	.14*	--		
13. Work-home conflict	-.05	.08	.17**	.10	.55**	-.15*	.18**	.00	-.20**	-.16**	-.55**	.05	--	
14. Emotional exhaustion	.08	-.05	.11	.04	.48**	-.24**	-.01	-.02	-.54**	-.24**	-.54**	-.06	.65**	--
15. Psychosomatic complaints	.25**	-.01	.08	-.08	.19**	-.25**	-.00	-.08	-.56**	-.24**	-.55**	-.01	.42**	.60**

Note:  $N = 279$ , \*\* $p < .01$ , \* $p < .05$ ; shaded area contains raw correlations between core constructs and outcomes.



Table 4: Summary of regression analyses for quality of working life outcomes.

Regression Models	M1	M2	M3	M4	M5	M6	M7
Outcomes	MOW	COM	WLB	WHE	WHC	EXH	PSC
<b>Step 1: Control variables</b>							
- Gender (0/1 for ♂/♀)	-.05	-.04	-.00	-.15*	.02	.08	.25**
- Age (years)	.14**	.05	.19**	.06	.04	-.06	.05
- Task complexity	.19**	.15*	-.02	-.02	.01	.02	-.04
- Task interdependence	-.06	-.05	.06	-.01	.00	-.04	.05
- Task overload	-.15**	-.10	-.20**	-.04	.50**	.48**	.17**
<b>Step 2: Core constructs</b>							
- Task autonomy (TAU)	.15*	.15	.19**	-.04	-.15*	-.25**	-.24**
- Task crafting (TCR)	-.05	-.01	.10	.05	.18**	-.00	.07
- Task i-deals (TID)	.25**	.14*	.10	.16*	-.05	.01	-.04
<b>Step 3: Interaction effects</b>							
- TAUxTCR	.04	-.04	-.08	.07	.07	.09	-.03
- TAUxTID	-.10	.04	.05	.00	.04	-.07	-.05
- TCRxTID	.09	.14*	.15*	.07	-.06	-.12*	-.16*
- TAUxTCRxTID	.17*	.19*	-.01	.20*	-.00	.05	.02
<b>Summary: Model fit statistics</b>							
Multiple R <sup>2</sup> (adjusted R <sup>2</sup> )	.56 (.55)	.21 (.18)	.17 (.15)	.11 (.07)	.54 (.51)	.50 (.27)	.18 (.15)
F (12; 260)	11.97**	5.85**	4.51**	2.70**	11.19**	9.24**	4.88**

Note:  $N = 279$ ; \*\* $p < .01$ , \* $p < .05$ ; standardized regression coefficients ( $\beta$ -weights).

## Discussion

Recent advances in our understanding of individual work redesign motivated the present investigation of the three modes of individual-level task flexibility (Grant & Parker, 2009; Parker, 2014; Parker et al., 2017). To the best of our knowledge, ours is the first study to investigate the combined effects of autonomy, job crafting and i-deals. We seek to advance research on work design, proactive work behavior, and related streams of literature by offering insights into the interplay of organizationally implemented, individually crafted, and interpersonally negotiated task flexibility. Our results indicate that task autonomy, task crafting, and task i-deals play distinct but synergistic roles in

self-directed improvement of working life. They also support the importance of task autonomy to quality of working life along with the potential synergy between i-deals and job crafting. Affective commitment, meaning of work, and work-home enrichment are positively influenced by task i-deals as well as by the 3-way interaction between task autonomy, crafting, and i-deals. Thus, improvements in the *positive indicators* of quality of working life appear to be at the core of the synergistic effects of task autonomy, task i-deals, and task crafting.

A second set of findings concerns the relationship between task i-deals and task crafting and their joint effects. We find strong positive correlations between i-deals and crafting, suggesting that engaging in one

can be synergistic with engaging in the other. Results also suggest joint effects of task i-deals and crafting on both positive and negative indicators. First, task i-deals and crafting have positive interaction effects on affective commitment and general wellbeing suggesting that work self-design via these two modes fosters positive psychological states and enables developmental work experiences. In addition, negative 2-way interactions on emotional exhaustion, and psychosomatic complaints, point towards another joint role of task i-deals and crafting, that is, preventing or counteracting the negative outcomes of adverse working conditions. We conclude that depending on its context and configuration, personally initiated work redesign can function in at least two ways. The joint combination of task i-deals and crafting can serve as a form of proactive coping where stressors are concerned, buffering or reducing job strain. Alternatively, they can serve as a proactive opportunity to support positive work experiences, for example, by creating or strengthening job features that enhance meaning, social relatedness, or better allow for developing new professional interests and competencies.

Task crafting is by far the most ambivalent of the three forms of task flexibility and its effects are a mixed bag of a few positive, some negative and several null effects when task crafting is considered on its own. Its positive contributions to quality of working life seem to require the presence of other modes of task flexibility, particularly i-deals, being only weakly related to quality of working life by itself. Moreover, its unexpected positive association with work-home conflict suggests that there are downsides to reworking one's tasks without authorization. This suggests a potential overlap between job crafting and the dysfunctional forms of coping exemplified by the self-endangering work behavior of extremely involved or „overcommitted“ workers, who invest themselves in work at the expense of their health and personal lives (Deci, Dettmers, Krause & Berset, 2016). Additional analyses showed a positive relationship between task crafting and reported overtime hours. Job modifications achieved through crafting thus may require increased time and effort by employees, inducing self-inflicted or self-endangering „subjectivized“ forms of work intensification and extensification – a key phenomenon first established in work sociology and increasingly subject to psychological research (Höge, 2011; Laurence, et al., 2016).

Our findings suggest that job crafting is most functional when it supplements or builds on negotiated agreements and can have negative consequences or limited value on its own. We concur with Rofcanin et al. (2016), that i-deals are more important than job crafting in explaining performance-relevant employee

attitudes and behaviors. The unauthorized nature of job crafting involves risks and costs for workers. In the absence of i-deals, job crafting may resemble coping behavior, deviance, and unauthorized actions involving the risk of being called out and negatively sanctioned (Cangiano, Parker & Yeo, 2019). In the presence of task i-deals, however, job crafting may resemble a form of „drift“, that is, an extension or variation of a negotiated arrangement that evolves over time. In this latter case, employees have a relational basis and an authorized personalized arrangement that can limit potential risks from unauthorized job changes. Without such supporting conditions, employees who craft substantive change to their job content may find themselves in an awkward position if they need to justify their exceptional or non-compliant task behavior. Our results also support the conclusion of Bredehöft, Dettmers, Hoppe and Janneck (2015), who, based on qualitative research, characterize job crafting as a „double-edged sword“ for employees. A promising approach to individualized job redesign may be to negotiate for personally valued tasks that allow for both high levels of autonomy and opportunity for further crafting over time in line with one's goals. Processes of work self-redesign thus can gain legitimacy through the development of occupational self-efficacy, expert knowledge, and mastery.

### *Implications for practice*

Employees seeking more fulfilling working conditions or reduced job stressors can benefit from careful use of both task crafting and i-deals. Our findings suggest that communicating with your boss to explore arrangements that better meet your needs is an important avenue for improving work life quality. Less effective is trying to reshuffle work duties on your own (the task crafting studied here), unless the work arrangement grants broad autonomy – and relations with customers and colleagues are not harmed by such changes. Negotiations for improved work conditions are often easier when you are interested in increasing the responsibilities and skills your job involves, than when trying to reduce them. However, both kinds of task adjustments can work if you maintain good communication with your manager and colleagues. Employers, in turn, should recognize the broad benefits from promoting worker autonomy, flexibility and use of valued skills at work. Jobs higher in autonomy provide better quality of working conditions and allow employees to bring more of their whole selves at work. Because individuals differ in their goals and private lives, being open to negotiation of customized arrangements can help strengthen the employment relationship, retain a valued employee and promote occupational well-

being. Task crafting, where employees seek to create more motivating and meaningful work by adding or changing the mix of activities they engage in, is part of self-expression on the job. Managers should seek information from employees regarding the conditions of work they find valuable and any special conditions that might make their work more interesting. The type of crafting activities workers engage in can provide insights into opportunities to make work more compelling and help recognize the various contributions employees make in their jobs.

### Limitations

This study has methodological limitations, specifically cross-sectional self-report data and a purposive (non-representative and non-random) convenience sample. However, single-source one-time measurement (employee survey designs) still provides the basis of large parts of organizational research and methodological concerns may be exaggerated (Conway & Lance, 2010). Nonetheless, follow-up studies incorporating additional data sources and measurement points are desirable to increase external validity and enhance our understanding regarding the dynamics among the three components of work self-redesign over time. In particular, this relates to the different meanings job crafting can take on, depending on whether it is used to supplement or substitute broader negotiated (i.e., authorized) agreements lending legitimacy to additional bottom-up actions to further customize work tasks.

### Conclusion

I-deals and job crafting represent proactive forms of behavior in organizations. They can operate synergistically to promote positive work experiences and buffer job strain. At the same time, contrasted with the consistent positive consequences of task i-deals, task crafting is a mixed bag of positive and negative consequences as a function of its context. In work providing high levels autonomy, these two self-initiated forms of work redesign may be part of an optimal work experience promoting personal growth and self-determination.

### References

- Bech, P. (2004). Measuring the dimensions of psychological general well-being by the WHO-5. *QoL Newsletter*, 32, 15-16.
- Black, S. J. & Ashford, S. J. (1995). Fitting in or making jobs fit: Factors affecting mode of adjustment for new hires. *Human Relations*, 48, 421-437.
- Bredelhöft, F., Dettmers, J., Hoppe, A. & Janneck, M. (2015). Individual work design as a job demand: The double-edged sword of autonomy. *Journal Psychologie des Alltagshandelns / Psychology of Everyday Activity*, 8 (2), 15-26.
- Cangiano, F., Parker, S. K. & Yeo, G. B. (2019). Does daily proactivity affect well-being? The moderating role of punitive supervision. *Journal of Organizational Behavior*, 40, 59-72.
- Conway, J. M. & Lance, C. E. (2010). What reviewers should expect from authors regarding common method bias in organizational research. *Journal of Business and Psychology*, 25, 325-354.
- Cooper, C. L. & Williams, J. (1991). A validation study of the OSI on a blue-collar sample. *Stress Medicine*, 7, 109-112.
- Deci, N., Dettmers, J., Krause, A. & Berset, M. (2016). Coping in flexible working conditions – Engagement, disengagement and self-endangering strategies. *Journal Psychologie des Alltagshandelns / Psychology of Everyday Activity*, 9 (2), 1-65.
- Demerouti, E. (2014). Design your own job through job crafting. *European Psychologist*, 19, 237-247.
- Frese, M., Garst, H. & Fay, D. (2007). Making things happen: Reciprocal relationships between work characteristics and personal initiative in a four-wave longitudinal structural equation model. *Journal of Applied Psychology*, 92, 1084-1102.
- Fried, Y., Grant, A. M., Levi, A. S., Hadani, M. & Slowik, L. H. (2007). Job design in temporal context: A career dynamics perspective. *Journal of Organizational Behavior*, 28, 911-927.
- Geurts, S. A. E., Taris, T. W., Kompier, M. A. J., Dijkers, J. S. E., van Hooff, M. L. M. & Kinnunen, U. M. (2005). Work-home interaction from a work psychological perspective: Development and validation of a new questionnaire, the SWING. *Work & Stress*, 19, 319-359.
- Grant, A. M. & Ashford, S. J. (2008). The dynamics of proactivity at work. *Research in Organizational Behavior*, 28, 5-34.
- Grant, A. M. & Parker, S. K. (2009). Redesigning work design theories: The rise of relational and proactive perspectives. *Academy of Management Annals*, 3, 317-375.
- Grote, G. & Guest, D. (2017). The case for reinvigorating quality of working life research. *Human Relations*, 70, 149-167.

- Hackman, J. R. & Oldham, G. R. (1980). *Work redesign*. Reading, MA: Addison-Wesley.
- Höge, T. (2011). Perceived flexibility requirements at work and the employee-work-orientation: Concept and measurement. *Journal Psychologie des Alltagshandelns / Psychology of Everyday Activity*, 4 (1), 5-21.
- Hornung, S. (2017). Antecedents and outcomes of job crafting: Situation-directed and self-directed strategies. *Proceedings of the 5th International Conference on Management, Leadership & Governance* (pp. 175-182). Reading, UK: ACPI.
- Hornung, S., Doenz, R. & Glaser, J. (2016). Exploring employee attitudes on fairness of idiosyncratic deals. *Organisational Studies and Innovation Review*, 2, 9-15
- Hornung, S., Glaser, J. & Rousseau, D. M. (2018). Idiosyncratic deals at work: A research summary. *Journal Psychologie des Alltagshandelns / Psychology of Everyday Activity*, 11 (1), 36-46.
- Hornung, S., Rousseau, D. M. & Glaser, J. (2008). Creating flexible work arrangements through idiosyncratic deals. *Journal of Applied Psychology*, 93, 655-664.
- Hornung, S., Rousseau, D. M., Glaser, J., Angerer, P. & Weigl, M. (2010). Beyond top-down and bottom-up work redesign: Customizing job content through idiosyncratic deals. *Journal of Organizational Behavior*, 31, 187-215.
- Ilggen, D. & Hollenbeck, J. (1991). The structure of work: Job design and roles. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (Vol. 2, pp. 165-208). Palo Alto: Consulting Psychologists Press.
- Jimmieson, N. L. (2000). Employee reactions to behavioural control under conditions of stress: The moderating role of self-efficacy. *Work & Stress*, 14, 262-280.
- Langfred, C. W. & Moye, N. A. (2004). Effects of task autonomy on performance: An extended model considering motivational, informational, and structural mechanisms. *Journal of Applied Psychology*, 89, 934-945.
- Laurence, G. A., Fried, Y. & Raub, S. (2016). Evidence for the need to distinguish between self-initiated and organizationally imposed overload in studies of work stress. *Work & Stress*, 30, 337-355.
- Liao, C., Wayne, S. J. & Rousseau, D. M. (2016). Idiosyncratic deals in contemporary organizations: A qualitative and meta-analytical review. *Journal of Organizational Behavior*, 37, S9-S29.
- Maslach, C. & Jackson, S. E. & Leiter, M. P. (1996). *Maslach Burnout Inventory Manual* (3rd ed.). Palo Alto: Consulting Psychologists Press.
- Meyer, J. P. & Allen, N. J. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of Occupational Psychology*, 63, 1-18.
- Morgeson, F. P. & Humphrey, S. E. (2006). The Work Design Questionnaire (WDQ): Developing and validating a comprehensive measure for assessing job design and the nature of work. *Journal of Applied Psychology*, 91, 1321-1339.
- Ng, T. W. & Feldman, D. C. (2015). The moderating effects of age in the relationships of job autonomy to work outcomes. *Work, Aging and Retirement*, 1, 64-78.
- Nielsen, K., Nielsen, M. B., Ogbonnaya, C., Käänsälä, M., Saari, E. & Isaksson, K. (2017). Workplace resources to improve both employee well-being and performance: A systematic review and meta-analysis. *Work & Stress*, 3, 101-120.
- Parker, S. K. (2014). Beyond motivation: Job and work design for development, health, ambidexterity, and more. *Annual Review of Psychology*, 65, 661-691.
- Parker, S. K. & Collins, C. G. (2010). Taking stock: Integrating and differentiating multiple forms of proactive behavior. *Journal of Management*, 36, 633-662.
- Parker, S. K., van den Broeck, A. & Holman, D. (2017). Work design influences: A synthesis of multilevel factors that affect the design of jobs. *Academy of Management Annals*, 11, 267-308.
- Rofcanin, Y., Berber, A., Koch, S. & Sevinc, L. (2016). Job crafting and i-deals: A study testing the nomological network of proactive behaviors. *International Journal of Human Resource Management*, 27, 2695-2726.
- Rousseau, D. M. (2005). *I-deals: Idiosyncratic deals employees bargain for themselves*. New York: Sharpe.
- Rousseau, D. M., Ho, V. T. & Greenberg, J. (2006). I-deals: Idiosyncratic terms in employment relationships. *Academy of Management Review*, 31, 977-994.
- Rousseau, D. M., Tomprou, M. & Simosi, M. (2016). Negotiating flexible and fair idiosyncratic deals (i-deals). *Organizational Dynamics*, 45, 185-196.
- Rudolph, C. W., Katz, I. M., Lavigne, K. N. & Zacher, H. (2017). Job crafting: A meta-analysis of relationships with individual differences, job characteristics, and work outcomes. *Journal of Vocational Behavior*, 102, 112-138.
- Sauter, S., Hurrell, J. & Cooper C. (1989). *Job control and worker health*. Chichester: Wiley.
- Schnell, T. (2009). The sources of meaning and meaning in life questionnaire (SoMe): Relations to demographics and well-being. *Journal of Positive Psychology*, 4, 483-499.
- Schnell, T., Höge, T. & Pollet, E. (2015). Predicting meaning in work: Theory, data, implications. *Journal of Positive Psychology*, 8, 543-554.

- Semmer, N. K., Zapf, D. & Dunckel, H. (1995). Assessing stress at work: A framework and an instrument. In O. Svane & C. Johansen (Eds.), *Work and health - scientific basis of progress in the working environment* (pp. 105-113). Luxembourg: Office for Official Publications of the European Communities.
- Spector, P. E. (1986). Perceived control by employees: A meta-analysis of studies concerning autonomy and participation at work. *Human Relations, 39*, 1005-1016.
- Terborg, J. R. (1981). Interactional psychology and research on human behavior in organizations. *Academy of Management Review, 6*, 569-576.
- Tims, M. & Bakker, A. B. (2010). Job crafting: towards a new model of individual job redesign. *SA Journal of Industrial Psychology, 36*, 1-9.
- Tims, M., Bakker, A. B. & Derks, D. (2012). Development and validation of the job crafting scale. *Journal of Vocational Behavior, 80*, 173-186.
- Weigl, M., Hornung, S., Parker, S. K., Petru, R., Glaser, J. & Angerer, P. (2010). Work engagement and accumulation of task, social, and personal resources: A three-wave structural equation model. *Journal of Vocational Behavior, 77*, 140-153.
- Wrzesniewski, A. & Dutton, J. E. (2001). Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review, 26*, 179-201.

Correspondence to:  
Priv.-Doz. Dr. Severin Hornung, MSc  
University of Innsbruck  
Institute of Psychology  
Maximilianstraße 2  
A-6020 Innsbruck  
Severin.Hornung@uibk.ac.at