

**Workplace Design: Conceptualizing and Measuring Workplace Characteristics for
Motivation**

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Abstract

Purpose: Although both the job and its broader context are likely to drive motivation, little is known about the specific workplace characteristics that are important for motivation. We present the Workplace Characteristics Model, which describes the workplace characteristics that can foster motivation, and the corresponding multilevel Workplace Design Questionnaire.

Design/methodology/approach: The model is configured as nine workplace attributes describing climate for motivation at two levels, psychological and organizational. The multilevel multi-time questionnaire was validated with data from 4287 individuals and 212 workplaces and integrated regulation as the criterion outcome.

Findings: Multilevel factor analysis and regression indicated good internal reliability, construct validity, and stability over time, and excellent concurrent and predictive validity of the questionnaire.

Research/Practical implications: The model could help to optimize job and workplace design by contextualizing motivation. The questionnaire offers advancement over single-level climate measures as it is validated simultaneously at two levels. Further research should focus on overcoming the low response rate typical for online surveys, on need fulfillment as the mediating variable, and on the joint influence of job and workplace characteristics on organizational behavior.

Originality/value: This work responds to calls to incorporate context in research into organizational behavior and job design. An understanding of the workplace is a first step in this direction. The questionnaire is the first to be validated at multiple levels of analysis. Ultimately, workplace design could support job design and the development of inherently motivating workplaces.

Keywords: workplace design, job design, climate, motivation, workplace characteristics model, workplace design questionnaire

Workplace Design: Conceptualizing and Measuring Workplace Characteristics for Motivation

Building on the cornerstone Job Characteristics Model (Hackman & Oldham, 1975), a substantial body of job design research has focused on the relationship between job attributes and organizational behavior (Morgeson & Campion, 2003). In recent years, however, scholars have argued for the importance of the broader context in organizational behavior (Bamberger, 2008; Grant et al., 2010; Johns, 2006, 2010; Rousseau, 2011; Rousseau & Fried, 2001). Because of the shared nature of work, if we try to understand individual experiences by focusing on either the job or the work environment only we are likely to fail. It is therefore important to understand the attributes of the workplace, beyond the immediate job, in relation to work outcomes and organizational behavior. To address this, we present the Workplace Characteristics Model (WPCM) that describes the attributes of the workplace that have a motivating potential and present the development of the multilevel Workplace Design Questionnaire to assess these, in this way testing the model.

The Workplace Characteristics Model

The WPCM is grounded on the axiom that individuals working in a given workplace are not independent from each other or their shared environment. Rather, to paraphrase Schneider (1990), individuals share *and shape* their workplace. Furthermore, the job and the workplace provide the environmental context to the work experience. Understanding the attributes of meaningful and motivating workplaces can add to our understanding of meaningful and motivating jobs. The WPCM posits that a number of workplace attributes can increase the probability that individuals will find jobs meaningful and worthwhile, as reflected in their motivation. Here, we present the model's main elements before we outline its constituent attributes.

Motivation as the criterion outcome. Motivation to engage with work and perform well is fundamental in organizational behavior. Indeed, job design theory places motivation as the causal output of job characteristics (Job Characteristics Model, Hackman & Oldham, 1975; Work Characteristics Model, Morgeson & Humphrey, 2006). But motivation is also sourced in the workplace climate (Parker et al., 2003), such that “system norms and values provide a climate that primes a particular motivational orientation within an organization” (Zaccaro, Ely, & Nelson, 2008; p. 333). In conceptualizing the attributes of the workplace for motivation, we can go beyond motivational orientation and a drive to act. In line with Self-Determination Theory (SDT; Deci & Ryan, 1985, 2000; Ryan & Deci, 2000a) we view the sense that individuals’ own behavior originates in themselves as the ultimate in motivation. Individuals function and develop most effectively as a consequence of social-environmental supports for motivation. A clearer understanding of how the workplace impacts on motivation can help to transcend the dominant modus operandi of focusing on individuals’ job experiences and overlooking the effects of the broader context (Johns, 2010; Rousseau & Fried, 2001). Because SDT goes beyond the notion of meaningful jobs to describe the broader context for motivation, it offers an appropriate lens for the WPCM.

The shared nature of work. The shared nature of the workplace among individuals who work together and the workplace attributes that emerge from that are at the core of the WPCM. As Mowday and Sutton (1993) observe, “organization members do not think, feel, or behave in isolation” (p. 205) but do internalize (Gruys, Stewart, Goodstein, Bing, & Wicks, 2008) and enact values and beliefs common in the workplace. Furthermore, through processes of social interaction and from the groups that individuals belong to (Hackman, 1992), collective experiences emerge within groups of individuals who work together (Morgeson & Hofmann, 1999). These shared understandings are similar but not tautological to personal experiences (Morgeson & Hofmann, 1999). Although the notion of shared meaning is not

new (Morgeson & Hofmann, 1999), it has largely been neglected in organizational behavior research. WPCM distinguishes between the personal and shared perceptions of the workplace.

Workplace characteristics reflect the job and the work environment. Following the JCM and SDT, both the immediate job and the workplace or the broader environment in which the job is carried out are likely to determine motivation. The job design and self-determination literatures can be viewed as the provenance of workplace design and a starting point for identifying the workplace attributes that can foster motivation, as outlined below.

The JCM describes the core attributes of meaningful jobs that have a motivating potential and, in the longer term, can lead to higher overall job satisfaction and quality work outcomes (Oldham & Hackman, 2010). However, some job characteristics can also represent shared experiences of the workplace. For example, autonomy is an emergent property of the workplace as much as it is a characteristic of the job. Autonomy-supportive environments may promote performance and motivation (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). Similarly, feedback, which is influenced by communication and social comparison processes (Festinger, 1954), can be sourced in the workplace context. Furthermore, social support is a ubiquitous resource that can be sourced in colleagues or managers, potentially describing an emergent property of the workplace (e.g. sense of community).

Additional attributes unique to the workplace can also help to foster motivation. The Work Characteristics Model (WCM; Morgeson & Humphrey, 2006) extends the JCM by including aspects of the work context (i.e., ergonomics, physical demands, work conditions, equipment use) and acknowledging context as “the link between jobs and the broader environment” (p. 1322). However, use of single-level models of personal experiences to describe the uniqueness of the workplace would not be appropriate. Similarly, aggregation of individual-level constructs to describe shared properties of the workplace would not be

without problems. Therefore, it would be imprudent to base a theory of workplace attributes for motivation on the job design literature only.

A complementary path is offered by SDT, which focuses on the social-environmental conditions that enhance volition, self-regulation, and healthy psychological adjustment (Deci, Connell, & Ryan, 1989; Deci & Ryan, 1985, 2000; Ryan & Deci, 2000a). According to SDT, “human beings [are] proactive organisms whose natural or intrinsic functioning can be either facilitated or impeded by the social context” (Deci, Eghrari, Patrick, & Leone, 1994, p. 120). It suggests that the environment can facilitate motivation by supporting or thwarting three universal innate psychological needs: autonomy (“experiencing choice and feeling like the initiator of one’s own actions”), competence (“concerns succeeding at optimally challenging tasks and being able to attain desired outcomes”), and relatedness (“establishing a sense of mutual reliance with others”, Baard, Deci, & Ryan, 2004, p. 2046; Ryan & Deci, 2000b). Achieving autonomy, competence and relatedness are essential for motivation (Baumeister & Leary, 1995; Deci & Ryan, 2000; Ilardi, Leone, Kasser, & Ryan, 1993), engagement (Meyer & Gagné, 2008), and performance (Baard et al., 2004). Here, the autonomy-competence-relatedness triptych offers a useful configural approach to identifying the workplace attributes that can foster motivation.

Workplace Characteristics for Motivation

Based on these foundations, the WPCM describes a range of characteristics of the workplace context that can foster motivation. The process of identifying these included consultation the relevant literatures, interviews with experts, and piloting of the framework (authors’ references). Here, we summarize the process but refer the reader to (authors’ reference) for a more detailed account of the specific steps. First, a range of workplace characteristics relevant to motivation were identified via a critical literature review. We used an iterative process of conceptual analysis and debate to reach agreement on the most

pertinent factors. We decided to limit the search to the workplace rather than broader organizational factors such as size or sector, because the latter are not amenable to change by design (authors' reference). Second, a qualitative interview study was used to explore the emergent pool of attributes with HR managers and health and well-being specialists (authors' reference). Finally, a pilot quantitative survey study was conducted with a distinct sample from one organization and six workplaces to assess the face validity of the model, adapt ambiguous items, and eliminate obsolete items (authors' reference). Appendix 1 lists the resulting workplace attributes, which are presented next.

Autonomy-Supportive Workplace Characteristics: Decision-making, Work Scheduling, and Role Flexibility. Autonomy-supportive attributes of the workplace are those that can enable individuals (i) to make decisions independently, (ii) to choose how to schedule or plan their work, and (iii) that allow them to be flexible and adaptable in fulfilling their roles. Decision-making or control is integral for motivation (JCM, Hackman & Oldham, 1975) and well-being (Demand-Control-Support model, Karasek & Theorell, 1990). The main consideration here is that autonomy originates in the workplace rather than the job. Furthermore, work planning refers to the opportunities in the workplace that allow individuals some leeway in scheduling their work. Finally, role flexibility, the ability to adapt work roles to the needs of the situation, is viewed as an essential environmental resource (Wrzesniewski & Dutton, 2001). These three dimensions describe a workplace that is characterized by control, initiative, participation, and flexibility, allowing individuals to perceive themselves as the initiators of their own actions, thus facilitating motivation.

Competence-Supportive Workplace Characteristics: feedback, appreciation, and supportive management. This dimension describes the attributes of the workplace (i) that provide non-controlling feedback, (ii) where work effort is appreciated, and (iii) where the management is supportive. Feedback, or the degree to which there is clear and useable

information on the effectiveness of one's work, is a core job dimension that can lead to positive outcomes by enhancing knowledge of results (Hackman & Oldham, 1975) and supporting self-determination (Ryan, 1982; Deci et al., 1989). Here, feedback relates not to personal task feedback but also an attitude to sharing, offering, and accepting feedback among colleagues. Furthermore, appreciation, or the degree to which work effort is appreciated and personal recognition tends to be provided in the workplace, is an important motivational work attribute that has been linked to successful coping and adaptation (Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007). Finally, the degree to which the management of the workplace shows concern and provides support to the employees can also support competence and motivation. Akin to the concept of transformational leadership (Rafferty & Griffin, 2004) management support in the form of consideration, encouragement, guidance and direction is integral for supporting the need for competence and internal motivation.

Relatedness-Supportive Workplace Characteristics: social support, trust, and sense of community. Workplaces that provide opportunities to establish a sense of connection and mutual reliance with colleagues, and are characterized by (i) support among colleagues, (ii) trust, and (iii) a sense of community, are those that can also support an individual's relatedness. Social support has been consistently linked with job satisfaction (de Jonge et al., 2001) and can guard against high demands and low control (Karasek & Theorell, 1990). As an attribute of the workplace, social support describes not necessarily one-on-one task or personal support but rather an amicable and collegial interpersonal climate. Related to this, trust is essential where interdependence and working together efficiently is important (Mayer, Davis, & Schoorman, 1995) for organizational citizenship behavior and collegiality (McMillan & Chavis, 1986). Finally, a sense of community is important for developing a feeling of belonging and willingness for personal investment (McMillan & Chavis, 1986), therefore too supporting the need for relatedness and increasing motivation.

The Workplace Design Questionnaire

A measure that adequately captures the identified workplace attributes would be a measure of climate for motivation that distinguishes between personal and shared perceptions of the workplace. Climate represents a set of properties of the work environment that can impact on individual and organizational outcomes (Patterson et al., 2005). A domain-specific perspective that incorporates both individual and collective representations of the climate offers the greatest potential for conceptualizing the workplace attributes for motivation. Although the relationship between climate and motivation is well established (Parker et al., 2003), to our knowledge no available job design or climate measure can achieve this.

The WPCM describes a domain-specific rather than generic climate (Schneider, 1990; Schneider, Ehrhart, & Macey, 2013). Because the focus of the climate measure matches the focus of the target outcomes, domain-specific climates have better predictive validity (Schneider, 1990; Schneider et al., 2013). Here, that domain is motivation. Furthermore, the WPCM views climate at both individual and group levels of analysis (Schneider et al., 2013). The psychological climate perspective argues that appraisals of the workplace are made by individuals and have a cognitive foundation (James, 1982; James et al., 2008). Where agreement is high among individuals in the same workplace, aggregate scores of attitudinal measures describe organizational climate (Gillespie, Denison, Haaland, Smerek, & Neale, 2008). The organizational perspective suggests that climate is an emergent property of the workplace (Schneider et al., 2013).

It has been argued that because organizational climate is an emergent phenomenon, it should not be viewed as an aggregate of individuals' perceptions (Glick, 1985). However, we propose that combining both levels into a single multilevel measure is not only possible by using the workplace as the reference but is also advantageous for a range of reasons. It can help to address the tendency to use aggregation at the cost of ignoring individual variation,

preventing errors of atomistic and ecological fallacies (Diez-Roux, 1998). It can circumvent conceptual problems of aggregating measures developed at different levels. By integrating two different sources of variation, it can also explain variability both between groups and within the same group and avoid reducing rich data to central tendencies. Finally, a multilevel questionnaire would also have stronger construct validity. Currently, even well-developed organizational climate measures tend to be validated at the individual level (e.g., Patterson et al., 2005).

Any measure should exhibit strong concurrent and predictive validity. A model of workplace attributes for motivation naturally has internal motivation as the criterion outcome. According to SDT, any environmental input can either be supporting or controlling and thwarting motivation and adjustment (Deci & Ryan, 1985; Ryan & Deci, 2000a). In the workplace, four motivation constructs are relevant, each closer to intrinsic motivation: extrinsic, introjected, identified, and integrated regulation. Here, the criterion outcome is integrated regulation, or “the most autonomous form of extrinsic motivation”, where “the more one internalizes the reasons for an action and assimilates them to the self, the more one’s extrinsically motivated actions become self-determined” (p. 62, Ryan & Deci, 2000c). [Please note that although analyses were carried out on extrinsic, introjected, identified, and integrated regulation, only the results for the latter are presented here. Results showed progressively stronger support for internal motivation (readers can contact the authors for the results)]. Because group-level constructs can explain additional variance in individual outcomes beyond the corresponding individual-level predictors (Spell & Arnold, 2007), we expect that both psychological and organizational climate levels will predict motivation.

Hypothesis 1: Workplace characteristics (at both psychological and organizational climate levels) will have a positive relationship with motivation (integrated regulation)

Method

Questionnaire development

The development of the WPDQ followed three principles. First, the referent-shift consensus model (Chan, 1998), where the intended nesting is used as the item referent, was used to phrase the items. Here, the referent was participants' workplace, which consists of co-located and interdependent individuals, focusing on one type of work activity, and reporting to one line manager. Within-group agreement tends to be higher when items have a group referent such as the first person plural personal pronoun "we" (Klein & Kozlowski, 2000a). Consequently, respondents were asked to indicate how true a range of statements were: "Considering the working conditions in your workplace in the last three months, indicate how true the following statements are for you. *In my workplace...*". Second, a 7-point Likert response scale was used (1=*strongly disagree* to 7=*strongly agree*) as seven points provide a better approximation to an interval scale than five points. Finally, because negatively worded items do not always denote opposites of the construct but can form a distinct dimension (Idaszak & Drasgow, 1987), all items were positively worded.

Overall, five or six items were developed for each attribute by adapting items from existing scales, adjusting wording, and adding new items. For example, the item "the job allows me to decide on the order in which things are done on the job" (Morgeson & Humphrey, 2006) was rephrased as "we can decide on the order in which things are done". As mentioned, a pilot study in one organization with six workplaces was conducted with a distinct sample (authors' reference) to assess the measure's face validity and conduct preliminary psychometric analyses (inter-item correlations, scale loadings). A balance between questionnaire reliability and length was aimed for. This process resulted in a total of 29 items (see Appendix 1). Here, we expand on these findings to report on the measure's concurrent and predictive validity.

Participants and procedure

Seventeen UK organizations from a range of sectors (manufacturing, education, advertising, construction, finance, retail, emergency services, and local government) took part. A total of 10004 questionnaires were collected online from 4838 individuals and 278 workplaces, at four data collection waves with a three-month lag. Response rates ranged from five to 21%, which is typical of online questionnaires (e.g., Kaplowitz, Hadlock, & Levine, 2004) and in cases where line managers do not actively encourage employees to participate. To ensure representativeness of the between-level estimates, workplaces with $n < 5$ were excluded from the analyses, reducing the sample to 8912 questionnaires (4597 individuals from 241 workplaces).

To ensure that agreement was adequate for aggregation, the $r_{wg(j)}$ for multiple items was calculated for each climate dimension (James, Demaree, & Wolf, 1984). Whilst an $r_{wg(j)} > .70$ is considered adequate for aggregation, the values are largely affected by group size and for large groups this can be a very conservative estimate (Dunlap, Burke, & Smith-Crowe, 2003). Therefore instead of relying on the .70 cut-off value we evaluated the significance of the $r_{wg(j)}$ scores for each workgroup (Dunlap et al., 2003), removing workplaces with non-significant $r_{wg(j)}$. TMmedian values for the $r_{wg(j)}$ scores ranged from .81 to .95, calculated separately for each data collection wave.

This preparation yielded a final of 8316 observations from 4287 individuals in 212 workplaces (65.4% women $M_{age}=42.5$ years, age range: 18–69 years) (2026 respondents completed the questionnaire once, 1006 twice, 742 three times, and 513 four times). The majority (50.8%) were educated at secondary level, 34.2% had an undergraduate and 15.0% a postgraduate degree. Job tenure was 10.7 years (range: 0–48.9 years). A range of occupations were represented: administrative, manual, professionals, services, and management.

Measures

The WPDQ was used to assess the nine workplace characteristics, as described above. The Motivation at Work Scale (MAWS; Gagné et al., 2010) was used to assess motivation and specifically integrated regulation (e.g., “because I enjoy this work very much”) on a 7-point Likert scale (1=*completely disagree* to 7=*completely agree*). MAWS has good validity and reliability properties in a range of occupational samples and sectors (Gagné et al., 2010). Age and gender were correlated with motivation and were therefore used as control variables.

Analytical procedure

Analyses were performed with R 2.15.3 (R Core Team, 2013) and *Mplus* 4.21 (Muthén & Muthén, 1998-2010). A four-step process to examining the questionnaire’s factor structure and reliability was used. First, a second-order single-level confirmatory factor analysis (CFA) model was tested using data from wave 1. To account for the nested nature of the data a sandwich estimator was used to estimate maximum likelihood with robust standard errors and chi-square. Expectation Maximization was used in the Maximum Likelihood estimation of the covariance matrix. Second, the higher-order part of the model was then tested and refined using item parceling with a multilevel confirmatory factor analysis (MCFA). For the first two steps the model was developed using data from the first data collection wave and refitted using data from the subsequent waves. Next, stability over time of the MCFA model was evaluated with data from data collection waves 2 to 4. A multi-group approach was used to compare the structure and stability of the factor loadings and intercepts of models from the first and subsequent waves. The multi-group approach rather than latent growth modeling (Vandenberg & Lance, 2000) was preferred as the latter would have required participants from all four data collection waves, restricting the usable sample size. Finally, the validity of the questionnaire was evaluated against motivation as the concurrent outcome (Hypothesis 1) using concurrent measurements (concurrent validity) and lagged measurements (predictive validity). For these models all data collection waves were

used with individual-level repeated observations nested in individuals, and group-level repeated measures nested in workplaces. For the latter, the interaction between workplaces and data collection wave was used to avoid using two random effects for the time variable (or two growth curves), which would complicate interpretation. Subsequently, the two groupings were specified as a crossed-classified (non-nested) instead of a using three-level structure. An additional fourth level was added to account for organizational-level variation. As such, the model involved three random intercepts (for individuals, for the interaction between workplaces and time, and for the organizations) and one random slope (for the individual growth curve). The exact equation used for evaluating the predictive validity of the questionnaire is available from the authors.

Results

Factor structure: Second-order CFA and MCFA

A range of indices are used to interpret the overall fit of the measure. These include the χ^2 (and $\Delta\chi^2$ for comparing models), Comparative Fit Index (CFI), Tucker Lewis index (TLI), the Root-Mean-Square Error of Approximation (RMSEA), and standardized root-mean-square residual (SRMR). Higher CFI and TLI values ($>.90$) and lower RMSEA ($\leq.05$) and SRMR ($\leq.80$) values generally indicate good fit (Hu & Bentler, 1999).

The results for the second-order single-level CFA indicate very good fit for the model, with $\chi^2(365)=1725.69$ ($N_{\text{individuals}}=2374$, $N_{\text{workplaces}}=154$), CFI=.96, TLI=.96, RMSEA=.04, and SMRM=.06. The results were comparable for wave 2 ($\chi^2(365)=1962.61$, $N_{\text{individuals}}=2548$, $N_{\text{workplaces}}=186$), three ($\chi^2(365)=1573.58$, $N_{\text{individuals}}=1855$, $N_{\text{workplaces}}=156$) and wave 4 ($\chi^2(365)=1403.94$, $N_{\text{individuals}}=1539$, $N_{\text{workplaces}}=147$). All other indices were the same as for wave 1, with the exception of wave 3 CFI=.97. In comparison, a model with 9 first order factors but a single second level factor showed fairly good fit ($\chi^2(365)=3667.67$ ($N_{\text{individuals}}=2374$, $N_{\text{workplaces}}=154$), CFI=.91, TLI=.90, RMSEA=.06, and SMRM=.10) but fared

significantly worse than the three factor model as indicated by the Satorra- Bentler test ($\Delta\chi^2=282.06$, $p<.001$) (Satorra & Bentler, 2001). The coefficients of the model developed using data from the first data collection are available from the authors.

For the MCFA model a model with three latent variables and nine indicators (the nine dimensions obtained using CFA) was tested. The MCFA models were examined for each wave using two different aggregation methods for the first-order factors: (a) as factor scores estimated by *Mplus* using the loadings as weights (parceled factors estimated from single level model) and (b) as means of the original items (parceled factors estimated as means of the items). This allowed to obtain consistent results regardless of the items parceling method (using the single level analysis or directly using the means). For responses with missing values on any of the indicators the mean scores were estimated using the available indicators.

Table 1 shows the means (*M*) and standard deviations (*SD*), ICC values and associated F scores, Cronbach's α reliability coefficients and correlations (*r*) for all first-order factors. Although the ICC values are relatively low, the associated F statistic was significant for all variables, indicating that we can reliably distinguish between different workplaces based on their scores. Further experimentation with subsets of the dataset revealed that the ICC values were not consistent in different organizations, which can be explained by between-organization differences in climate. For example, if autonomy is more important in one organization, more variance would be explained by workplace in that specific organization.

[Insert Table 1 about here]

Table 2 shows the MCFA results for each of the four data collection waves using both parceling techniques. The models that used loadings weighting were marginally better than the models that used mean scores. However, the results were close enough to suggest that adopting the simpler approach of mean scores in future research is preferable ($\chi^2(57)=464.49$, $N_{\text{individuals}}=2200$, $N_{\text{workplaces}}=154$), CFI=.96, TLI=.95, RMSEA=.06, SMRM_{within}=.05, and

SMRM_{between}=.17). All models had very good fit. Although the literature recommends SMRM values of above .08, the SMRM_{between} value in all models tested was consistently above.08. However we do not consider this to be a problem as these recommendations apply to the within level and to our knowledge, no empirical evaluations of the SRMR of simulated multilevel data exist. Finally, we evaluated a single factor two-level model for comparison purposes. The results showed that the single factor model did not fit the data well ($\chi^2(63)=2943.80$, $N_{\text{individuals}}=2200$, $N_{\text{workplaces}}=154$), CFI=.67, TLI=.63, RMSEA=.14, SMRM_{within}=.11, and SMRM_{between}=.83) indicating that the three factor model is preferable. Model coefficients are presented in Table 3.

[Insert Tables 2 and 3 about here]

Measurement invariance

Measurement invariance was examined using a multi-group comparison between the four data collection waves and examining invariance of the factor loadings and of the intercepts. To ensure the versatility and robustness of the measure we used the mean estimates of the factor scores with multilevel CFA models, as discussed above. The tests involved comparing a baseline model with no measurement invariance (everything allowed to vary) to models with different invariance restrictions using the Satorra-Bentler $\Delta\chi^2$ test (Satorra & Bentler, 2001). Table 4 shows all model comparisons where a non-significant effect indicates measurement invariance. The restricted (invariant) model is as good as the baseline model where everything is allowed to vary. Overall, the results supported (a) full invariance at the between level, (b) partial invariance at the within level, where role flexibility is not invariant but everything else is, and (c) no support for intercept invariance.

[Insert Table 4 about here]

Concurrent and predictive validity

To evaluate the concurrent and predictive validity of the measure the analyses examined whether the within- and between-level latent variables predicted integrated regulation. The scale scores were estimated as means of the original items, which were then aggregated to form the workplace-level measures and to group-center the repeated observations. Table 5 presents the results of the growth models with concurrent measurement of both predictors and outcomes (concurrent validity). Table 6 presents the equivalent models tested with a 3-month time-lag for the outcomes (predictive validity). Supporting the hypothesis, excellent concurrent and predictive validity at both levels was observed.

[Insert Tables 5 and 6 about here]

Discussion

The present paper offered a way to conceptualize the attributes of the workplace that can support individual motivation and presented a measure and a study to test this model. The potential for developing the concept of workplace design is based on three observations: (1) that individuals share and shape their workplace, (2) that attributes of the workplace have a motivating potential in the same way that characteristics of the job also have a motivating potential, and that (3) these attributes can be described as both personal and collective experiences of the shared workplace. The Workplace Characteristics Model (WPCM) consists of nine attributes of the workplace for motivation grouped under three climate dimensions (autonomy, competence, and relatedness). Motivation here is conceptualized not merely as drive but as a sense that individuals' own behavior originates in themselves (Baard et al., 2004). These attributes exist as both individual perceptions of the workplace and the shared perceptions of individuals in a given workplace and can therefore be assessed at two levels as psychological or organizational climate.

A test of the model with integrated regulation was offered in line with SDT as a way to validate the corresponding Workplace Design Questionnaire (WPDQ). The WPDQ has was

found to have good internal consistency and stability at both the single and multilevel configurations over four time points (covering a total of ten months). Tested using data collected at different times, analysis of measurement invariance showed that the same items resulted in the same configurations and revealed comparable relationships between items and latent constructs. The only exception was flexibility at the individual level for the second of the four data collection waves. This may indicate that role flexibility at the individual level is experienced differently in different workplaces, but it is difficult to assert what this exception may imply without further investigation. As expected, the measure is an excellent predictor of motivation over time.

This model has potential implications for theory and research. It offers a way forward for understanding the meaning of context for organizational behavior and job design (Grant et al., 2010; Johns, 2010; Morgeson et al., 2010). Observing a decline in the volume of job design research, Grant et al. (2010) argued that job design theory does no longer reflect the impact of contextual changes in the work environment, whereas Johns (2010) suggested that “job design has too often been treated as a phenomenon rather isolated from its surroundings” (p. 367). An understanding of the job and workplace characteristics that can together impact on motivation could help to realize how “design is embedded in a large work context” (Johns, 2010). Viewing job design and workplace design as allies in supporting organizational behavior could highlight new challenges in job design and organizational behavior research and therefore help to put ‘job design in context’ (Grant et al., 2010).

The model also offers a contribution to the climate literature by building on the observation that individuals are nested within work groups (Kozlowski & Klein, 2000) and identifying a configuration of the perceived and shared workplace attributes that can support motivation. Despite their common foundations, the psychological and organizational climate traditions have evolved in different ways, but could be integrated again conceptually and

methodologically. The conceptualization of workplace attributes for motivation as two climate levels provides an alternative to the psychological vs. organizational climate debate by demonstrating that it is possible to have a tool that measures both.

Methodologically, this work offers a domain-specific climate measure of workplace characteristics that partitions the between and within variation components. A measure that is validated simultaneously at both levels is an improvement in the measurement of domain-specific climates, which has tended to focus on either psychological or organizational climate depending primarily on the level at which the outcome variable is measured. Neither aggregated measures of psychological climate at the organizational level nor disaggregated measures of organizational climate at the individual level are appropriate as they can lead to analytical and conceptual problems. However, with advancement of multilevel techniques (Muthén & Muthén, 2007) it is possible to develop measures that incorporate both levels. The WPDQ addresses the tendency to use aggregated individual-level measures to assess group-level constructs when they have not been validated at the group level and at the cost of ignoring individual variation. It also circumvents analytical and conceptual problems of aggregating or disaggregating measures developed at different levels. The approach undertaken here resulted in a unique tool that is relevant and appropriate for assessing phenomena at the group level (Klein & Kozlowski, 2000a, 2000b) and for understanding workplace characteristics for motivation.

The measure is practical, versatile, and can inform actionable solutions. It could be used, for example, to diagnose the impact of specific workplace characteristics on employee motivation and, by extension, on related affective and behavioral outcomes. Optimal configurations of workplace characteristics could then be examined and designed to foster motivation in specific workgroups. Additionally, optimal configurations of workplace characteristics that support or complement good job design could also be identified.

Moreover, perceptions of organizational climate could be examined separately from perceptions of psychological climate, depending on the target organizational behavior. This would allow to develop specific resources to develop individual-focused or workplace-wide solutions to support motivation. Furthermore, the measure could be used to examine individuals' deviations from the shared experiences of the work group. These may reflect not just subjective experiences but also objective differences in the work environment such as differential treatment by the manager (Van Yperen & Snijders, 2000) or job design configurations. Finally, although further research will be necessary to examine potential links between workplace attributes and needs fulfillment, thus further elaborating on the model, the three climate dimensions have been shown to be good indicators of the extent to which the workplace can support motivation.

On the whole, this work contributes to calls to consider the broader work environment when theorizing in organizational behavior (Bliese & Jex, 2002; Johns, 2006; Rousseau & Fried, 2001). Oldham and Hackman (2010) too remarked that they “under-recognized the importance for work redesign of the broader context – that is, the organization’s formal properties (e.g., centralization, formalization, technology, and control systems) and the culture within which the organization operates” (p. 472). A clearer understanding of the meaning of the shared workplace can help to transcend the predominant *modus operandi* of focusing on individuals’ personal experiences of their job and omitting their experiences of the workplace or organizational context (Johns, 2010; Rousseau & Fried, 2001). Similarly, in response to calls for establishing links between the individual and organizational levels (Chen, Bliese, & Mathieu, 2005; Kozlowski & Klein, 2000), the proposed model can explicate a missing link in the relationship between the workplace and organizational behavior.

This work has potential limitations. First, the response rates in this study were low. However, they were typical of response rates for online questionnaires (e.g., Kaplowitz,

Hadlock, & Levine, 2004). Nevertheless, it was possible to ascertain the representativeness of the sample in each workplace, although the safeguards taken against non-representativeness for small workplaces can still be potentially problematic for larger workplaces. Furthermore, careless respondents may be prone to response bias when survey items are positively worded. It is therefore recommended that future research using this measure should safeguard against response bias by screening for careless respondents. Finally, although it may be argued that the exclusive use of self-report measures and the lack of objective measures are limitations, these are not limitations considering the specific aims of this study.

A range of potential avenues for future research can be identified. First, research can be broadened to other organizational behavior and individual-level outcomes, such as performance, organizational citizenship behavior, affective well-being, job satisfaction, or withdrawal behaviors. While the job design and self-determination literatures posit motivation as a fundamental criterion outcome, research has linked each of the identified workplace attributes to a range of additional outcomes, directly and indirectly. Therefore, although motivational mechanisms have received substantial support in relation to individual and group-level outcomes, alternative pathways could also be examined (Parker et al., 2001). Conversely, because the job and the workplace are not the only determinants of motivation, the joint effects of workplace and job characteristics and additional influences such as leadership, HR policies, or psychological contract could be examined. For example, research has emphasized manager support for employee self-determination as a strong predictor of employee attitudes (Deci et al., 1989). Finally, because there is little, if any, research on how inherently healthy and motivating workplaces can be developed, organizational intervention research could also focus on the potential to design workplaces supportive of motivation.

The WPCM describes the workplace attributes, conceptualized as psychological and organizational climate, that have the potential to foster individual motivation. It views job and

workplace design as allies in determining motivation. It can also help to contextualize job design and organizational behavior, suggesting a potentially fruitful line of research.

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Table 1. Cronbach's α , ICC1 and ICC2 reliability coefficients, F values, means, standard deviations, and correlations among parceled first-order factors

	α	ICC1	ICC2	F	M	SD	1	2	3	4	5	6	7	8
1 Decision-making	.82	.07	.53	2.14 (153, 2216) ***	5.42	1.25								
2 Work planning	.91	.08	.56	2.29 (153, 2214) ***	5.67	1.20	.71							
3 Role flexibility	.90	.05	.45	1.80 (153, 2181) ***	5.42	1.20	.53	.52						
4 Feedback	.86	.04	.38	1.61 (153, 2091) ***	4.37	1.41	.37	.34	.43					
5 Appreciation	.92	.04	.40	1.67 (153, 2087) ***	4.35	1.62	.37	.34	.42	.79				
6 Supportive management	.95	.05	.44	1.78 (153, 2071) ***	4.65	1.57	.39	.35	.41	.65	.78			
7 Social support	.89	.03	.30	1.44 (153, 2077) ***	5.51	1.09	.29	.29	.32	.37	.38	.43		
8 Trust	.84	.02	.22	1.28 (153, 2072) *	5.48	1.14	.34	.33	.37	.45	.49	.54	.50	
9 Sense of community	.95	.05	.43	1.77 (153, 2076) ***	5.43	1.31	.29	.29	.36	.40	.44	.44	.52	.68

Note. All correlations $p \leq .001$. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$; Mean scores were used for the parceling of the items. Results obtained using the parceled factors estimated from the first model were comparable.

Table 2. Fit indices for the MCFA model

	Wave 1	Wave 2	Wave 3	Wave 4
<i>Parceled factors estimated from single level model</i>				
N _{individuals}	2374	2548	1855	1539
N _{workplaces}	154	186	156	147
χ^2 (57)	426.208	392.35	301.69	282.57
CFI	.98	.98	.98	.98
TLI	.98	.98	.98	.98
RMSEA	.05	.05	.05	.05
SRMR _{within}	.05	.05	.05	.05
SRMR _{between}	.15	.18	.20	.47
<i>Parceled factors estimated as means of the items</i>				
N _{individuals}	2200	2411	1752	1459
N _{workplaces}	154	186	156	147
χ^2 (57)	464.49	412.42	327.47	285.58
CFI	.96	.97	.97	.97
TLI	.95	.96	.96	.96
RMSEA	.05	.05	.05	.05
SRMR _{within}	.05	.05	.05	.05
SRMR _{between}	.17	.23	.25	.25

Note. *N* is smaller when parceling is based on means because of missing values

Table 3. Model coefficients for the MCFA model

	Psychological climate			Organizational climate		
	Estimate	SE	Standardized	Estimate	SE	Standardized
<i>Autonomy-supportive climate dimensions</i>						
Decision-making	1.00	-	.84	1.00	-	1.00
Work planning	.93	.03	.81	.91	.16	1.00
Role flexibility	.75	.03	.64	.61	.08	.99
<i>Competence-supportive climate dimensions</i>						
Feedback	1.00	-	.83	1.00	-	.99
Appreciation	1.31	.03	.94	1.32	.28	.99
Supportive management	1.09	.03	.82	2.05	.52	.99
<i>Relatedness-supportive climate dimensions</i>						
Social support	1.00	-	.62	1.00	-	.99
Trust	1.43	.07	.84	1.07	.28	.99
Sense of community	1.52	.07	.80	1.83	.48	.99
<i>Correlations</i>						
Autonomy – Competence	.60	.04	.52	.03	.01	.56
Competence – Relatedness	.48	.03	.63	.02	.01	.74
Autonomy – Relatedness	.35	.03	.52	.02	.01	.40

Note. All $p \leq .001$

Table 4. Measurement invariance

	No invariance (baseline)	Within factor loadings	Between factor loadings	All factor loadings	Partial invariance: within factor	Partial invariance: all loadings	Intercepts
χ^2 (df)	1538.84 (228)	1533.87 (246)	1504.01 (246)	1506.69 (264)	1526.08 (245)	1492.59 (263)	1561.05 (290)
Scaling	.97	1.01	1.02	1.05	.99	1.05	1.06
$\Delta\chi^2$ (df)		35.22** (18)	25.09 (18)	58.15* (36)	23.85 (17)	46.29 (35)	78.99 *** (27)
CFI	.96	.96	.96	.96	.96	.96	.96
TLI	.95	.95	.96	.96	.95	.96	.96
RMSEA	.05	.05	.05	.05	.05	.05	.05
SRMR _{within}	.05	.05	.05	.05	.05	.05	.05
SRMR _{between}	.23	.22	.18	.18	.23	.18	.17

Note. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$; No invariance: Baseline model where all parameters are allowed to vary between the different data collection waves; Within factor loadings: Within factor loadings are restricted to be equal for all 4 waves; Between factor loadings: Between factor loadings are restricted to be equal for all 4 waves; All factor loadings: Both within and between factor loadings are restricted to be equal for all 4 waves; Partial invariance within: Within factor loading are restricted to be equal for all 4 waves except role flexibility; Partial invariance all loadings: Both within and between factor loadings are restricted to be equal for all 4 waves except role flexibility; Intercepts: Intercepts are fixed

Table 5. Concurrent validity: Growth model with concurrent DV and IVs

<i>Fixed Effects</i>	Intrinsic motivation		
	<i>B</i>	<i>SE</i>	<i>LRT</i>
(Intercept)	0.47	0.29	
Wave	-0.05	0.01	21.74 ***
Age	0.01	0.00	10.21 ***
Gender (Male)	-0.06	0.04	2.76
Autonomy(PC)	0.16	0.02	102.39 ***
Competence(PC)	0.21	0.01	252.56 ***
Relatedness(PC)	0.20	0.02	136.67 ***
Autonomy(OC)	0.18	0.05	15.44 ***
Competence(OC)	0.25	0.04	46.87 ***
Relatedness(OC)	0.31	0.05	37.56 ***
<i>Random Effects</i>	<i>Var</i>	<i>Corr</i>	
Individuals: Intercept	1.03		
Individuals: Wave	0.02	-0.31	
Workplaces: Intercept	0.01		
Organizations: Intercept	0.08		
Residual	0.42		
<i>Log likelihood</i>	-10547		

Note. $N_{\text{organizations}} = 17$, $N_{\text{workplaces}} = 639$ (total for all data collection waves – 208 unique workplaces); Intrinsic motivation $N_{\text{observations}} = 7448$, $N_{\text{individuals}} = 3716$; The referent category for gender is “female”; Autonomy(PC), Competence(PC), and Relatedness(PC) refer to psychological climate attributes; Autonomy(OC), Competence(OC), and Relatedness(OC) refer to the corresponding organizational climate attributes; Corr shows the correlation between the random effects for the Individual level (Intercept and beta coefficient for Wave); The significance of individual predictors was assessed as a likelihood ratio test (LRT) between models with and without each of the predictors; * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Table 6. Predictive validity: Growth model with lagged time DV and IVs

<i>Fixed Effects</i>	Intrinsic motivation		
	<i>B</i>	<i>SE</i>	<i>LRT</i>
(Intercept)	0.82	0.47	
Wave	-0.02	0.02	0.64
Age	0.01	0.00	8.41 **
Gender (Male)	-0.04	0.06	0.48
Autonomy PC	0.08	0.02	9.43 **
Competence PC	0.16	0.02	63.11 ***
Relatedness PC	0.14	0.03	30.39 ***
Autonomy OC	0.18	0.08	5.36 *
Competence OC	0.23	0.06	12.57 ***
Relatedness OC	0.22	0.09	6.40 *
<i>Random Effects</i>	<i>Var</i>	<i>Corr</i>	
Individuals: Intercept	1.07		
Individuals: Wave	0.03	-0.32	
Workplaces: Intercept	0.04		
Organizations: Intercept	0.10		
Residual	0.49		
<i>Log likelihood</i>	-5215		

Note. $N_{\text{organizations}} = 17$, $N_{\text{workplaces}} = 434$ (total for all data collection waves – 181 unique workplaces); Intrinsic motivation $N_{\text{observations}} = 3468$, $N_{\text{individuals}} = 1930$; The remainder notes are as for Table 5; * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.