



Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the Work-related Basic Need Satisfaction scale

Anja Van den Broeck^{1*}, Maarten Vansteenkiste², Hans De Witte¹,
Bart Soenens² and Willy Lens¹

¹University of Leuven, Belgium

²Ghent University, Belgium

The satisfaction of the basic psychological needs for autonomy, competence, and relatedness, as defined in Self-Determination Theory, has been identified as an important predictor of individuals' optimal functioning in various life domains. The study of work-related need satisfaction seems, however, hampered by the lack of a validated measure. To assist future research, the present study aimed to develop and validate a Work-related Basic Need Satisfaction scale (W-BNS). Using four Dutch-speaking samples, evidence was found for the three-factor structure of the scale, the discriminant validity, and the reliability of the three need satisfaction subscales as well as their criterion-related and predictive validity. The W-BNS may therefore be considered as a promising tool for future research and practice.

Various scholars have suggested that needs are the fundamental determinants of human behaviour (Latham & Pinder, 2005). Maslow (1943), for instance, defined five hierarchically ordered needs ranging from physiological sustainability to self-actualization. McClelland (1965) formulated, among others, the needs for achievement, affiliation, and power. Self-Determination Theory (SDT; Deci & Ryan, 2000; Vansteenkiste, Ryan, & Deci, 2008) postulates three innate psychological needs, which have to be satisfied for individuals to flourish, that is, the needs for autonomy (i.e., experiencing a sense of volition and psychological freedom), competence (i.e., feeling effective), and relatedness (i.e., feeling loved and cared for).

The empirical literature attesting to the beneficial effects of need satisfaction as defined in SDT is growing exponentially, both in general and in specific life-domains (Deci & Ryan, 2008). The coherent development of the literature of work-related need

* Correspondence should be addressed to Anja Van den Broeck, University of Leuven, Tiensestraat 102, 3000 Leuven, Belgium (e-mail: anja.vandenbroeck@psy.kuleuven.be).

satisfaction seems, however, to be hampered by the lack of a specific validated measure, leading to the reliance on *ad hoc* scales (e.g., Roca & Gagné, 2008). Using four different samples, we aim to develop and validate a work-related basic need satisfaction measure, which might foster the study of need satisfaction in the workplace.

Basic psychological need satisfaction in SDT

Conceptualization

In SDT, basic psychological need satisfaction is assumed to represent the underlying motivational mechanism that energizes and directs people's behaviour (Deci & Ryan, 2000). Psychological need satisfaction is regarded as the essential nutriment for individuals' optimal functioning and well-being, as water, minerals, and sunshine are essential for plants to bloom (Deci & Ryan, 2000; Ryan, 1995). In SDT, three basic needs are distinguished: the needs for autonomy, competence, and relatedness.

First, the need for autonomy represents individuals' inherent desire to feel volitional and to experience a sense of choice and psychological freedom when carrying out an activity (deCharms, 1968; Deci & Ryan, 2000). Although related, SDT's concept of autonomy is somewhat different from the conceptualizations of autonomy typically held in organizational psychology (e.g., Morgeson & Humphrey, 2006). Karasek (1979), for instance, equated autonomy with decision latitude and control over skill utilization. Hackman and Oldham (1976) defined autonomy in terms of 'substantial freedom, independence and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out' (p. 258). First, unlike SDT which refers to the subjective experience of psychological freedom and choice during activity engagement, these definitions refer to autonomy as a task characteristic. Second, although autonomy as a task characteristic is likely to contribute to feelings of psychological freedom, people might also experience autonomy satisfaction when they depend on others and even when they follow others' requests. Employees might, for instance, follow-up a request from their supervisor (and thus fail to be independent) but nonetheless act willingly because their supervisor provided them a meaningful rationale for doing so (Soenens *et al.*, 2007).

Second, the need for competence is defined as individuals' inherent desire to feel effective in interacting with the environment (Deci & Ryan, 2000; White, 1959). It is prominent in the propensity to explore and manipulate the environment and to engage in challenging tasks to test and extend one's skills. Competence satisfaction allows individuals to adapt to complex and changing environments, whereas competence frustration is likely to result in helplessness and a lack of motivation (Deci & Ryan, 2000). The need for competence is rather uncontroversial in organizational psychology. Similar constructs figure in Vroom's (1964) Expectancy-Value Theory and Bandura's (1997) Self-Efficacy Theory, although some differences deserve being mentioned. Specifically, outcome expectancies and self-efficacy represent *acquired cognitions* with respect to one's capacities to successfully accomplish *specific future* tasks. These aspects are therefore positively valued as far as they help one in reaching desired goals. The need for competence, on the other hand, represents an *inborn* need. Competence satisfaction refers to a more *general, affective* experience of effectiveness which results from mastering a task. Despite these conceptual differences between self-efficacy and the need for competence, both are likely to be correlated at the empirical level.

Finally, the need for relatedness is defined as individuals' inherent propensity to feel connected to others, that is, to be a member of a group, to love and care and be

loved and cared for (Baumeister & Leary, 1995). The need for relatedness is satisfied when people experience a sense of communion and develop close and intimate relationships with others (Deci & Ryan, 2000). The assumption that individuals have the natural tendency to integrate themselves in the social matrix and benefit from being cared for is equally emphasized in developmental approaches such as Attachment Theory (Bowlby, 1969). It is consistent with concepts in organizational psychology such as social support (Viswesvaran, Sanchez, & Fisher, 1999) and loneliness at work (Wright, Burt, & Strongman, 2006).

Characteristics of the basic psychological needs

The SDT view on the basic psychological needs differs in several ways from other well-known need perspectives (e.g., Maslow, 1943; McClelland, 1965). First, Maslow considers human needs to be *hierarchically ordered*: higher order needs only become prominent when lower order needs are sufficiently satisfied. In contrast, SDT does not postulate a particular order in which the three needs have to be met. Instead, *all* three needs are considered important for individuals' flourishing. Second, McClelland considers needs to be *acquired* through learning or socialization: individuals who are lauded after achieving a particular goal learn to attach positive feelings to achievement situations and, as a result, develop a strong need for achievement (Winterbottom, 1959). Rather than learned, SDT considers the basic psychological needs to be *innate*, fundamental propensities, much like biological needs (Deci & Ryan, 2000). SDT herein aligns with Baumeister and Leary (1995) and White (1959). Although individuals from different age groups and different cultures may express and satisfy their basic psychological needs in different ways, everybody is thus likely to benefit from having the basic psychological needs satisfied. In line with this claim, various studies have provided evidence for the importance of need satisfaction in various age groups (e.g., Soenens *et al.*, 2007) and in culturally very diverse samples (e.g., Deci *et al.*, 2001; Vansteenkiste, Lens, Soenens, & Luyckx, 2006).

Third, as McClelland focuses upon differences in need *strength* or the importance individuals attach to particular needs, he assumes, for instance, that individuals with a high need for achievement are more strongly motivated in achievement situations compared to individuals with a low need for achievement. In contrast, SDT does not focus upon individual differences in need strength, but considers the degree to which people are able to *satisfy* their fundamental needs as the most important predictor for optimal functioning (Deci & Ryan, 2000). Consequently, SDT maintains that, for instance, positively perceived feedback is beneficial for all employees as it satisfies their inborn need for competence (Mouratidis, Vansteenkiste, Lens, & Sideridis, 2008).

Finally, both Maslow and McClelland adopt a *deficit* approach towards needs. According to Maslow, particular needs become less potent when they are reasonably well gratified. Similarly, McClelland assumes that a particular need drives behaviour until sufficient need satisfaction is reached. Then, the behaviour is stopped until the need becomes salient again. For instance, people with a high need for affiliation will search for warm social contacts. Once such contact has taken place, the need is temporarily reduced and the behaviour wanes. According to SDT, individuals do not need to experience a deficit for the needs to fuel behaviour. Rather, individuals are attracted to situations in which need satisfaction may occur. Once their needs are satisfied, they are likely to feel energized and to actively engage in *subsequent need fulfilling* activities (Deci & Ryan, 2000).

SDT's empirical basis

Consistent with SDT, several studies have shown positive relations between need satisfaction and optimal functioning, both at the interpersonal and intra-individual level (e.g., Mouratidis *et al.*, 2008; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000) and in general (Sheldon, Elliot, Kim, & Kasser, 2001) as well as across different life-domains (see Deci & Ryan, 2008, for an overview). In the context of work, initial evidence was found for positive relations between a composite score of need satisfaction (i.e., aggregated across the three needs) and employees' work-related well-being (i.e., job satisfaction, work engagement, and lower burnout), favourable attitudes (i.e., decreased turnover-intentions, increased readiness to change), and higher performance (see Gagné & Deci, 2005; Van den Broeck, Vansteenkiste, & De Witte, 2008, for overviews). Work-related need satisfaction has furthermore been related to increased general well-being and to less ill-being (e.g., Baard, Deci, & Ryan, 2004). Finally, studies in which the three needs were examined separately showed that each of the three needs correlated positively with employees' optimal functioning (e.g., Lynch, Plant, & Ryan, 2005), which is consistent with SDT's claim that the satisfaction of each of the three basic needs contributes to individuals' flourishing (Deci & Ryan, 2000).

Satisfaction of the three needs may, however, relate differently to controlled motivation. According to SDT, controlled motivation results from experiencing external (i.e., a bonus, supervisory approval) or internal (i.e., guilt, shame) contingencies to conduct a particular behaviour. It is contrasted with autonomous motivation, which is prominent when employees engage in an activity because they consider it personally valuable or intrinsically interesting (Deci & Ryan, 2000). Autonomous motivation correlates positively with, for instance, work-related well-being and optimal performance as it is conducive to the satisfaction of the three basic needs (Gagné & Deci, 2005; Van den Broeck, Vansteenkiste, & De Witte, 2008). When employees feel controlled, in contrast, their need for autonomy is clearly forestalled (Deci & Ryan, 2000). Employees, who are, for instance, forced to meet a deadline, will experience little volition in executing the task. Despite this pressure, they might, however, manage to satisfy their needs for competence and relatedness by accomplishing the assigned task or by receiving social support from others. Such satisfaction is, however, not guaranteed as feeling pressured to engage in a work activity is not necessarily accompanied by feelings of effectiveness and interpersonal connection (Markland & Tobin, 2010).

Apart from relating to employees' optimal functioning, basic need satisfaction is also useful to understand the motivating impact of supervisors' leadership styles (e.g., Deci *et al.*, 2001) and job characteristics (Van den Broeck, Vansteenkiste, & De Witte, 2008), and their relationships with employees' well-being and performance.

Present research

Clearly, the construct of basic need satisfaction may be useful to gain insight in employees' functioning and to examine the motivational potential of organizational factors. In this promising body of research, however, different *ad hoc* instruments have been used. Examples are the basic need satisfaction at work scale (Baard *et al.*, 2004; Deci *et al.*, 2001; Vansteenkiste *et al.*, 2007) and the work motivation scale (Ilardi, Leone, Kasser, & Ryan, 1993; Kasser, Davey, & Ryan, 1992). This might hamper the coherent and cumulative development of this line of research for various reasons. First, the scales used thus far have not been formally validated. Second, these scales sometimes contain items that do not tap into the satisfaction of the basic needs as such.

For instance, the basic need satisfaction at work scale includes items which refer to job characteristics such as social support (e.g., 'People at work tell me I am good at what I do'), which may represent an antecedent of basic need satisfaction rather than the experience of need satisfaction *per se*. Alternatively, the work motivation scale assesses potential consequences of basic need satisfaction such as intrinsic motivation (e.g., 'How much do you enjoy your work'). Third, little research has been conducted to gain insight in the role of need frustration. This is an important issue in light of previous critical accounts suggesting that SDT is exclusively concerned with human flourishing (Pyszczynski, Greenberg, & Solomon, 2000). It is furthermore important to examine whether need satisfaction and need frustration fall along one single bipolar continuum or rather represent two separate constructs. The latter possibility may be suggested based on the research on the distinction between pleasure and displeasure (Barrett, Mesquita, Ochsner, & Gross, 2007; Watson & Tellegen, 1985) and the work by Herzberg (1968), who considered satisfaction and dissatisfaction in the workplace as two fundamentally different processes with different antecedents and consequences.

To account for the limitations of currently available scales, this study aims to develop a Work-related Basic Need Satisfaction scale (W-BNS) and provide first evidence for its validity by examining the Dutch version. To this end, the following steps were taken (DeVellis, 2003; Hinkin, 1998). In Phase 1, a large item pool was generated. In Phase 2, a final set of items was selected based on item analysis, exploratory factor analysis (EFA), and item-total correlations. In Phase 3, confirmatory factor analysis (CFA) was used to further validate the factor structure of the scale and to examine the discriminant validity of the different needs. In Phase 4, other psychometric properties of the scale were examined, such as the scale's internal consistency reliability and the degree to which method-effects confound this self-report measure. Specifically, we examined the role of impression management, that is, individuals' tendency to create and maintain desired perceptions of themselves (Paulhus, 1991), as impression management has been identified as a potential confound in self-report research in organizational psychology (e.g., Ferris, Brown, Berry, & Lian, 2008).

Finally, in Phase 5, we examined the discriminant, criterion-related, and predictive validity of the W-BNS. To this end, we first examined whether the W-BNS related to environmental factors. In line with previous studies (e.g., Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008), we examined the associations between work-related need satisfaction and job resources as job resources are considered to yield a strong motivational impact (Bakker & Demerouti, 2007). Specifically, we expected positive associations between need satisfaction and task autonomy, skill utilization, and social support (Karasek, 1979). No previous studies have examined unique associations of the three needs with these job resources. Nevertheless, based on conceptual grounds, we hypothesized that task autonomy is more closely related to autonomy satisfaction than to the satisfaction of the other needs (Hypothesis 1a), whereas skill utilization and social support relate most strongly to the competence (Hypothesis 1b) and relatedness satisfaction (Hypothesis 1c), respectively.

In line with SDT and previous work, we furthermore examined the associations between need satisfaction and employees' optimal functioning in terms of job satisfaction, work engagement, burnout, life satisfaction, organizational commitment, and performance to assess the criterion-related validity of the scale. Specifically, the three needs were expected to relate positively to job satisfaction and work engagement (Hypotheses 2a and 2b) and negatively to burnout (Hypothesis 2c), as need satisfaction is considered to relate positively to both hedonic and eudaimonic well-being

(Ryan, Huta, & Deci, 2008) and negatively to ill-being (Ryan & Deci, 2000). Work-related need satisfaction was also hypothesized to relate positively to general well-being as indexed by life-satisfaction (Hypothesis 2d). This correlation may, however, be less strong than the correlations with the aforementioned aspects of domain specific well-being as domain-specific measures of need satisfaction are theorized to relate more strongly to domain specific, relative to general, indicators of optimal functioning (Vallerand, 1997). Further, work-related need satisfaction was expected to relate positively to organizational commitment (Hypothesis 2e) as SDT maintains that individuals are more attracted to situations where their needs have been satisfied (Greguras & Diefendorff, 2009). Specifically, we examined affective organizational commitment as this may be considered the main component of organizational commitment, which is most predictive of, for instance, job satisfaction and positive affect, and is strongly influenced by organizational aspects such as leadership and job characteristics (Allen & Meyer, 1990). Finally, in line with the assumption that need satisfaction also influences behaviour (Baard *et al.*, 2004), need satisfaction was hypothesized to relate positively to performance (Hypothesis 2f). Furthermore, all three needs were expected to relate positively to employees' autonomous motivation (Hypothesis 3a). Divergent relationships may, however, emerge for controlled motivation (Deci & Ryan, 2000). Specifically, the need for autonomy was hypothesized to be forestalled by controlled motivation, while this would not necessarily be the case for the needs for competence and relatedness (Hypothesis 3b).

Finally in Phase 5, we examined the potential of the W-BNS to predict an objective, outcome over time, that is, actual turnover. As mentioned, SDT maintains that individuals feel naturally attracted to and will become committed to situations in which their needs are satisfied. Conversely, need frustration might prompt employees to leave the organization. In line with this, a composite score of need satisfaction (Vansteenkiste *et al.*, 2007) and the separate needs of competence and relatedness (Richer, Blanchard, & Vallerand, 2002) have previously been found to relate negatively to turnover-intentions. The present study extends this research by examining whether need satisfaction is predictive of actual turnover over a period of 6 months (Hypothesis 4).

Method

Procedure and participants

Four samples (total $N = 1,185$) were used throughout the five phases of this research: a large convenience sample and three organization-specific samples. *Sample 1* was collected by 120 undergraduate students of a large university in the Dutch-speaking part of Belgium. As part of an introductory course on quantitative research, the students distributed five questionnaires among friends or relatives with at least 3 years of working experience as an employee. The questionnaires included a letter explaining that participation was voluntary and anonymous. The completed questionnaires were either picked up by the students in sealed envelopes or were directly sent back to the researchers by the participants using pre-stamped envelopes. In total, 560 complete questionnaires were returned. *Sample 2* constituted an independent sample of 194 researchers working at the same university in the Dutch-speaking part of Belgium. They were recruited via an announcement in the on-line newsletter of the university. *Sample 3* included 170 Belgian employees of a HR-service company (response rate 30%). *Sample 4* comprised 261 Dutch call centre agents (response rate 87%). The data for the latter two samples were collected via a voluntary and confidential Internet survey,

which participants filled out during regular working hours. Information about participants' background variables is displayed in Table 1. Table 2 provides an overview of how the samples were used throughout the five phases, along with the variables assessed in each sample.

Table 1. Demographic characteristics of the participants in the four samples

	Sample 1	Sample 2	Sample 3	Sample 4
<i>N</i>	560	194	170	261
Gender				
Male (%)	51	35	33	46
Female (%)	49	65	67	54
Age				
Range (years)	21–63	22–54	22–60	18–58
Mean (years)	38.62	29.52	36.70	28.23
SD (years)	11.25	6.43	8.17	9.00
Education				
Primary or secondary education (%)	39	0	29	41
Bachelor's degree (%)	44	0	56	54
Masters' degree (%)	17	100	15	5
Professional level				
Blue collar worker (%)	17	0	0	0
Administrative personnel (%)	40	0	41	100
Professionals (%)	20	65	35	0
Managers (%)	5	35	24	0
Hours worked				
Full-time (%)	77	100	73	71
Part-time (%)	23	0	27	28
Contract				
Fixed (%)	93	–	94	13
Temporary (%)	7	–	6	86
Tenure				
Range	1 month to 37 years	3 months to 31 years	1 month to 39 years	1 week to 7 years
Mean (years)	9.50	6.52	9.78	1.24
SD (years)	9.96	6.42	10.55	1.72

Measures

Impression management

Impression management was assessed in Sample 2 with the 20-item Impression Management Scale of the Balanced Inventory of Desirable Responding (Paulhus, 1991). Participants responded to items such as 'I sometimes tell lies if I have to' ($\alpha = .83$).

Job resources

Task autonomy, skill utilization, and social support were measured in Samples 3 and 4. Across the samples, slightly different measures were used. In Sample 3, *task autonomy* was measured with five items developed by Rosenthal, Guest, and Peccei (1996) such as 'I can decide for my own which task I execute' ($\alpha = .76$). *Skill utilization* was assessed with two items of Van Veldhoven and Meijman (1994) such as 'My job

Table 2. Overview of the sample throughout the five phases

	Sample 1	Sample 2	Sample 3	Sample 4
Phase 1				
Item development				
Phase 2				
Item selection	x			
Phase 3				
Factor structure	x	x	x	x
Phase 4				
Intercorrelations	x	x	x	x
Reliability	x	x	x	x
Method effects		x		
Phase 5				
Criterion-related and discriminant validity				
Job resources (i.e. task autonomy, skill utilization, social support)			x	x
Well-being (i.e. jobsatisfaction, engagement, burnout)			x	x
Organizational commitment			x	x
Performance			x	x
Motivation			x	
Predictive validity				
Turnover				x

requires me to be creative' ($r = .50$). *Social support* was measured with five items of Rosenthal *et al.* (1996) such as 'My colleagues help me to get things done' ($\alpha = .84$). In Sample 4, *task autonomy* was assessed with two items of Van der Doef and Maes (1999) such as 'My job allows me to make a lot of decisions on my own' ($r = .43$). *Skill utilization* was assessed with eight items of Van der Doef and Maes (1999) such as 'My job requires me to learn new skills' ($\alpha = .76$). *Social support* was assessed with six items of Van Veldhoven and Meijman (1994) such as 'I can ask my colleagues for help' ($\alpha = .90$).

Employees' functioning

Job satisfaction, work engagement, burnout, life satisfaction, and affective commitment were assessed in Samples 3 and 4 with the same measurements. Autonomous and controlled motivation were measured in Sample 3. Turnover was available in Sample 4. *Job satisfaction* was measured with one face-valid item 'How satisfied are you, all in all, with your job?' This item relates strongly to a multi-item assessment of job satisfaction (Wanous, Reichers, & Hudy, 1997). *Work engagement* was measured with the five items for vigour of the Utrecht Work Engagement Scale (Schaufeli, Salanova, Gonzalez-Roma, & Bakker, 2002) such as 'At my work, I feel bursting with energy' ($\alpha_{\text{Sample 3}} = .91$, $\alpha_{\text{Sample 4}} = .90$). Vigour is considered the main component of work engagement (González-Romá, Schaufeli, Bakker, & Lloret, 2006). *Burnout* was assessed with the five items for exhaustion of the Dutch version of the Maslach Burnout Inventory General Survey (Schaufeli & Van Dierendonck, 2000) such as 'I feel totally exhausted on my job'

($\alpha_{\text{Sample 3}} = .90$, $\alpha_{\text{Sample 4}} = .90$). Exhaustion is considered the central aspect of burnout (Maslach, Schaufeli, & Leiter, 2001). *Life satisfaction* was tapped with the item 'How satisfied are you, all in all, with your life'. *Affective organizational commitment* was measured with five items of Cook and Wall (1980). It includes items such as 'I am quite proud to be able to tell people for whom I work' ($\alpha_{\text{Sample 3}} = .83$, $\alpha_{\text{Sample 4}} = .89$). Similar to the scale of affective organizational commitment of Allen and Meyer (1990), these items tap into workers' feelings of pride (i.e., identification) and attachment (i.e., loyalty) to the organization and their willingness to invest effort in their jobs for the sake of the organization (i.e., involvement; Allen & Meyer, 1990). *Performance* was tapped via the self-report performance scale of Abramis (1994) in Sample 3. This measure includes five items such as 'How well did you achieve your objectives during the last week' ($\alpha = .90$). In line with this, in Sample 4, respondents rated their performance on eight self-report items such as 'To what extent did you take care of the quality of your calls' ($\alpha = .83$). These items were developed in collaboration with the HR manager to assess job specific performance.

Autonomous and controlled motivation

Autonomous and controlled motivation were measured with 16 self-constructed items, which were inspired by the self-regulatory scales of Ryan and Connell (1989) and Vansteenkiste, Sierens, Soenens, Luyckx, and Lens (2009). These items tapped employees' motivation to put effort in their jobs out of external (e.g., 'Because others put pressure on me to do so') or internal (e.g., 'Because I will feel bad about myself otherwise') pressure or because they find their job personally important (e.g., 'Because putting efforts in my job aligns with my personal values') or interesting and enjoyable (e.g., 'Because I enjoy this work very much'). Consistent with previous research (e.g., Vansteenkiste, Lens, Dewitte, De Witte, & Deci, 2004), items referring to external and internal pressure were grouped as controlled motivation ($\alpha = .70$), whereas the items regarding personal significance and enjoyment were grouped as autonomous motivation ($\alpha = .90$).

Turnover-rates

Turnover-rates were provided by the HR manager. Six months after participants had reported on their need satisfaction, it was noted whether each of the participants was still employed in the organization. By that time 31% of the participants ($N = 80$) had left; 75% of these leavers ($N = 60$) had initiated the contract termination themselves and were labelled as cases of self-initiated turnover.

Phase I: Item development

To develop an item pool, we first studied the literature and available measures of need satisfaction. Then, we selected and developed appropriate items taking the following criteria into account. First, items needed to reflect employees' perceptions of need satisfaction rather than antecedent need-supportive conditions or potential consequences. Second, specific work setting terminology was avoided such that the scale would be applicable to all work contexts. Finally, both positive (i.e., need satisfaction) and negative (i.e., need frustration) items were included for the above-mentioned theoretical reasons as well as to avoid that an acquiescence bias (i.e., the tendency to

agree with all items; Billiet & McCleendon, 2000) would contaminate participants' answers.

All items were formulated as declarative statements following the stem 'The following statements aim to tap into your personal experiences at work'. Responses were made on a five-point Likert scale ranging from 1 (totally disagree) to 5 (totally agree). The large pool of items was further reduced by the authors and a panel of four academic judges who were all familiar with SDT's conceptualization of basic psychological needs. The final item pool included 26 items: 8 items for autonomy, 10 for relatedness, and 8 for competence. Before administration, these items were randomly ordered.

Phase 2: Item selection

First, we examined item completeness and the distributions of the item scores as indicated by the mean, median, standard deviation, skewness, and kurtosis in Sample 1. The number of missing values was low, ranging from 0 to 1%, and was considered to be random (Cohen & Cohen, 1983). The means of all items ranged from 1.58 to 4.20. All standard deviations exceeded 0.50, being indicative of adequate variability (Stumpf, Colarelli, & Hartman, 1983). Skewness values showed that particularly the relatedness-frustration items showed a tendency for low scores.

In a next step, we conducted EFA (principal components analysis) using an oblique rotation (i.e., PROMAX). The scree plot suggested that three or four factors could be retained (Cattell, 1966). Subsequent parallel analysis (O'Conner, 2000) supported the four-factor solution. The first three factors clearly represented the needs for relatedness, competence, and autonomy, respectively. The fourth factor was more difficult to interpret as it included one autonomy satisfaction item (i.e., 'I feel pressured at work') and two competence satisfaction items (i.e., 'I really have to make an effort to do my job well' and 'I sometimes think my job is difficult'). As we aimed to reduce the total number of items, we deleted these three items leaving a set of 23 items (7 autonomy, 10 relatedness, and 6 competence items). We further optimized the scale length using corrected item-total correlations. As shown in Appendix, all items met the cut-off criterion of .30 (Nunnally & Bernstein, 1994). To arrive at six items per need, further item deletion within the autonomy and relatedness subscales was carried out via a process of stepwise removal of the items with lower corrected item-total correlations, thereby keeping the balance of need satisfaction and need frustration items. In the final set of 18 items, the scales of autonomy and relatedness contained three satisfaction and three frustration items, while the competence scale included four satisfaction and two frustration items.

The factor structure of this final set of items was then examined via EFA (Table 3). Both the scree test and parallel analysis favoured the three-factor structure, which clearly included the needs for competence, relatedness, and autonomy. All items had a minimum pattern loading of $|.58|$ on their expected factor and no cross-loadings above $|.14|$ emerged.

Phase 3: Factor structure

Next, we examined the factor structure of the need satisfaction scale and tested the discriminant validity of the different subscales. To this end, a CFA was conducted, using maximum-likelihood estimation in Lisrel 8.54 (Jöreskog & Sörbom, 2004). To rule out potential methodological explanations if the results of the CFA in Sample 2 would fail

Table 3. Pattern coefficients of the EFA on the items of the W-BNS

	Components		
	1	2	3
I don't really feel connected with other people at my job (R)	.05	-. .84	.09
At work, I feel part of a group	.05	.68	.08
I don't really mix with other people at my job (R)	.03	-. .82	.08
At work, I can talk with people about things that really matter to me	-.03	.60	.20
I often feel alone when I am with my colleagues (R)	-.09	-. .72	.06
Some people I work with are close friends of mine	-.03	.72	.06
I don't really feel competent in my job (R)	-. .59	.11	.08
I really master my tasks at my job	.81	-.01	-.10
I feel competent at my job	.85	-.01	-.05
I doubt whether I am able to execute my job properly (R)	-. .58	-.04	-.20
I am good at the things I do in my job	.82	.04	-.01
I have the feeling that I can even accomplish the most difficult tasks at work	.71	.05	.07
I feel like I can be myself at my job	.14	-.12	.61
At work, I often feel like I have to follow other people's commands (R)	.09	-.07	-. .85
If I could choose, I would do things at work differently (R)	.10	-.05	-. .82
The tasks I have to do at work are in line with what I really want to do	.07	.01	.70
I feel free to do my job the way I think it could best be done	.11	-.01	.65
In my job, I feel forced to do things I do not want to do (R)	.04	.11	-. .64

Note. (R) Reversed item. The highest loadings are shown in bold.

to confirm the earlier results obtained in the EFA in Sample 1, CFA was performed in Sample 1 as well as in Sample 2 (Van Prooijen & Van Der Kloot, 2001).

In each sample, the hypothesized three-dimensional model (Model A) was compared with three different two-dimensional models in which two needs were taken together and contrasted with the remaining need (Models B-D) and with the one-factor model combining all three dimensions (Model E). Additionally, the three-factor model was compared to a two-factor model (Model F) differentiating between need satisfaction and need frustration items. In addition to these first-order factor models, two higher order factor structures were examined. Specifically, in Model G, the three needs were modelled as higher order factors with each of them being represented by a first order need satisfaction and need frustration component. In Model H, need frustration and need satisfaction were modelled as higher order factors, each enclosing three first-order factors including either the satisfaction or the frustration items of the needs.

As suggested by Hu and Bentler (1999), model fit was evaluated using three goodness of fit indices: the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the standardized root mean square residuals (SRMR). RMSEA below .05 in combination with SRMR values below .09 indicate excellent fit, whereas values below .08 and .10, respectively, indicate good fit (Byrne, 2001). CFI cut-off values of .95 indicate excellent fit, whereas values of .90 indicate good fit (Hu & Bentler, 1999). Satorra-Bentler scaled χ^2 (SBS- χ^2 ; Satorra & Bentler, 1994) difference tests were used to evaluate the differences in fit. As data screening using Prelis 2.71 (Jöreskog & Sörbom, 2004) revealed data non-normality at the univariate and the multivariate level, in all subsequent models, both the covariance matrix and the asymptotic covariance matrix

Table 4. Fit indices for the various measurement models of need satisfaction in Samples 1 and 2

Sample	Models	SBS- χ^2	df	p	RMSEA	CFI	SRMR	Compared with	Δ SBS- χ^2	df	p	
Sample 1	Model A	Autonomy versus relatedness versus competence	247.00	132	.001	.04	.98	.05				
	Model B	Autonomy-relatedness versus competence	672.72	134	.001	.09	.94	.07	A	425.72	2	.000
	Model C	Autonomy-competence versus relatedness	779.65	134	.001	.09	.93	.08	A	532.65	2	.000
	Model D	Autonomy versus relatedness-competence	1,234.14	134	.001	.12	.89	.10	A	987.14	2	.000
	Model E	Autonomy-relatedness-competence	1,343.70	135	.001	.13	.87	.10	A	1,096.70	3	.000
	Model F	Need satisfaction versus need frustration	1,353.88	134	.001	.13	.88	.10	A	1,106.88	2	.000
	Model G	Second order factors of the three needs	167.11	126	.01	.02	.99	.04				
	Model H	Second order factors of satisfaction versus frustration	327.74	128	.001	.05	.96	.07	G	160.63	2	.000
Sample 2	Model A	Autonomy versus relatedness versus competence	204.18	132	.001	.05	.96	.07				
	Model B	Autonomy-relatedness versus competence	581.68	134	.001	.13	.89	.13	A	377.50	2	.000
	Model C	Autonomy-competence versus relatedness	472.93	134	.001	.11	.90	.11	A	268.75	2	.000
	Model D	Autonomy versus relatedness-competence	1,236.74	134	.001	.20	.78	.18	A	1,032.56	2	.000
	Model E	Autonomy-relatedness-competence	1,086.08	135	.001	.18	.77	.17	A	881.90	3	.000
	Model F	Need satisfaction versus need frustration	1,086.21	134	.001	.18	.77	.17	A	882.03	2	.000
	Model G	Second order factors of the three needs	170.51	126	.01	.04	.97	.06				
	Model H	Second order factors of satisfaction versus frustration	346.66	128	.001	.09	.90	.13	G	176.15	2	.000

were used, and the SBS- χ^2 (Satorra & Bentler, 1994) instead of the common χ^2 was inspected (see Table 4).

Results revealed that the three-factor solution (Model A) fitted the data well in both Samples 1 and 2 (Table 4). Moreover, significant differences in χ^2 -value indicated that Model A yielded a superior fit compared to any other first-order factor model in both samples. All items had significant loadings (ranging from .50 to .85, $p < .001$, with an average loading of .67 in both samples) on their intended latent factor. Further, as respects the second-order factor models, Model G was superior to Model H.¹ These results indicate that the W-BNS items are most meaningfully grouped content-wise (i.e., in terms of the needs for autonomy, competence, and relatedness; Model G) rather than in terms of the distinction between the positively (i.e., satisfaction) and negatively (i.e., frustration) worded items (Model H). In sum, the results of the CFA favoured the three-factor structure of the questionnaire and indicated the distinctiveness of the subscales for autonomy, relatedness, and competence. The three-factor model also yielded good fit in Sample 3, SBS- $\chi^2(132) = 234.91$, $p < .001$; CFI = .93, RMSEA = .07; SRMR = .09, and Sample 4, SBS- $\chi^2(132) = 232.42$, $p < .001$; CFI = .92, RMSEA = .08; SRMR = .08, which provides further evidence for the scale's internal structure.

Phase 4: Intercorrelations, reliability, and method effects

Across the four samples, the latent variables of autonomy and competence satisfaction correlated on average .46, autonomy and relatedness satisfaction correlated on average .58, and competence and relatedness satisfaction correlated on average .28. The reliabilities of the autonomy, competence, and relatedness satisfaction scales were on average .81, .85, and .82, respectively.

Although the scales were reliable, as the W-BNS relies on self-report, method effects may contaminated the responses. To examine this issue, we investigated whether impression management biases the participants' responses. Analyses were performed in Sample 2, following the procedure outlined by Williams and Anderson (1994). First, a baseline model was computed in which impression management does not confound the responses on the W-BNS. In this model, the relations between the latent variable for impression management and the three needs were constrained to zero; SBS- $\chi^2(662) = 935.65$, $p < .001$; RMSEA = .05; CFI = .93; and SRMR = .09. Second, a confounded measurement model was inspected in which impression management was assumed to influence the responses on the W-BNS. In this model, paths were allowed between impression management and the indicators of the different needs, that is, the 18 need-items; SBS- $\chi^2(644) = 913.68$, $p < .001$; RMSEA = .05; CFI = .94; and SRMR = .07. The size of the paths between impression management and each of the items of the W-BNS ranged between .01 and .29, with an average loading of .11. The confounded model did not yield improved fit compared to the baseline model, Δ SBS- $\chi^2(18) = 21.97$, ns, which suggested that impression management did not significantly confound participants' answers on the W-BNS.

¹ The first-order factor model included in Models G and H yielded adequate fit in both Sample 1; SBS- $\chi^2(120) = 132.32$, ns; CFI = .99, RMSEA = .02; SRMR = .03, and Sample 2; SBS- $\chi^2(120) = 165.74$, $p < .001$; CFI = .97, RMSEA = .04; SRMR = .06. In both samples, the satisfaction and frustration components of each of the needs were highly related, with correlations ranging from $-.87$ to $-.98$. Therefore, the satisfaction–frustration structure may be considered of secondary importance relative to the content-based differentiation of the needs, which is also evident in the superiority of Model G over Model H.

Phase 5: Criterion-related and discriminant validity

Prior to assessing the criterion-related validity of W-BNS, it was considered important to examine the potential overlap between work-related need satisfaction, environmental aspects, and employees' functioning. CFA (available upon request) indicated that four-factor models differentiating each of the three needs (first factor) from the criterion-related variables yielded a good fit to the data, which was better compared to the alternative three-factor models in which the criterion-related variables were modelled as a latent factor together with one of the needs. These results suggest that the need satisfaction measures can be distinguished from the criterion-related variables.

The correlations between satisfaction of the three needs and the criterion-related variables are presented in Table 5. The comparison of these correlations using the procedure of Meng, Rosenthal, and Rubin (1992) learned that task autonomy was more strongly related to autonomy satisfaction than to satisfaction of the needs for competence ($z_{\text{Sample 3}} = 2.53$; $z_{\text{Sample 4}} = 3.96$, p 's < .001) and relatedness ($z_{\text{Sample 3}} = 5.42$, $p < .001$; $z_{\text{Sample 4}} = 2.61$, $p < .01$). These results support Hypothesis 1a. In line with Hypothesis 1b in Sample 3, skill utilization was more strongly associated with competence satisfaction than with autonomy satisfaction ($z_{\text{Sample 3}} = 2.04$, $p < .05$) but was equally related to competence satisfaction and relatedness satisfaction ($z_{\text{Sample 3}} = 1.12$, ns). Hypothesis 1b could thus be partially corroborated in Sample 3. In Sample 4, skill utilization was more strongly related to autonomy ($z_{\text{Sample 4}} = -7.04$, $p < .001$) and to relatedness ($z_{\text{Sample 4}} = -4.91$, $p < .001$) than to competence satisfaction, to which it was unrelated. Hypothesis 1b was thus rejected in Sample 4. In line with Hypothesis 1c, social support was more strongly related to relatedness than autonomy ($z_{\text{Sample 3}} = 3.47$; $z_{\text{Sample 4}} = 3.68$, p 's < .001) and competence ($z_{\text{Sample 3}} = 5.28$; $z_{\text{Sample 4}} = 3.76$, p 's < .001) satisfaction.

Table 5. Zero-order correlations between need satisfaction, job resources, and employees' functioning in Samples 3 and 4

	Need for autonomy		Need for competence		Need for relatedness	
	Sample 3	Sample 4	Sample 3	Sample 4	Sample 3	Sample 4
Job resources						
1. Task autonomy	.45**	.47**	.23**	.22**	.02	.33**
2. Skill utilization	.13	.55**	.32**	.10	.21**	.38**
3. Social support	.34**	.39**	.10	.33**	.58**	.58**
Optimal functioning						
4. Job satisfaction	.66**	.54**	.18*	.15*	.41**	.40**
5. Vigor	.54**	.49**	.41**	.31**	.38**	.40**
6. Exhaustion	-.52**	-.28**	-.27**	-.26**	-.32**	-.23**
7. Life satisfaction	.30**	.22**	.24**	.16**	.41**	.32**
8. Organizational commitment	.51**	.58**	.18*	.18**	.36**	.42**
9. Performance	.31**	.21**	.44**	.35**	.19*	.18**
10. Autonomous motivation	.59**		.23**		.40**	
11. Controlled motivation	-.18*		.00		.00	

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

As expected, satisfaction of each of the three needs was positively associated with job satisfaction (Hypothesis 2a) and vigour (Hypothesis 2b) and negatively with exhaustion (Hypothesis 2c). Further, in line with Hypothesis 2d, satisfaction of the three needs was positively related to life satisfaction. As expected, the associations with life satisfaction were somewhat less strong than the associations with work-related indicators of well-being. Two exceptions need to be mentioned: competence satisfaction related more strongly to life satisfaction than to job satisfaction and satisfaction of the need for relatedness was more strongly related to life satisfaction than to vigour in Sample 3. In line with the hypotheses, work-related need satisfaction related positively to affective organizational commitment (Hypothesis 2e) and self-reported performance (Hypothesis 2f). Finally, as expected, all three needs related positively to autonomous motivation (Hypothesis 3a), while only autonomy satisfaction related negatively to controlled motivation (Hypothesis 3b).

To assess the predictive validity of need satisfaction with respect to turnover, a logistic regression analysis was performed in Sample 4. In line with the expectations (Hypothesis 4), autonomy satisfaction associated negatively with effective turn-over (odd ratio = .37, $p < .001$), but no significant associations were found for competence (odd ratio = 1.07; ns) or relatedness (odd ratio = 1.05; ns) satisfaction. Hypothesis 4 was thus partially corroborated.

Discussion

In SDT, satisfaction of the basic needs for autonomy, competence, and relatedness is considered as a crucial condition for individuals' thriving (Deci & Ryan, 2000). Several studies, across different life domains, have provided evidence for this claim (e.g., Deci & Ryan, 2008; Vansteenkiste *et al.*, 2008). Research on need satisfaction in the field of organizational psychology, however, might be hampered by the lack of a valid and reliable domain-specific measure of need satisfaction. Therefore, the purpose of the present study was to develop a W-BNS and validate its Dutch version.

Results across four samples, totalling 1,185 employees, provided good support for the psychometric properties of the W-BNS. Across the four samples, the scale demonstrated a clean factor structure. Consistent with SDT, the three needs satisfaction measures were found to represent related yet distinct constructs. Furthermore, the satisfaction and frustration items could best be modelled as simultaneous indicators of a higher order need construct, suggesting that satisfaction and frustration of each of the needs may best be conceived of as opposite poles of the same underlying continuum. The subscales for each of the needs proved to have good reliability and participants' answers to the items were not significantly affected by impression management.

Further, in general, satisfaction of the three needs was found to be related to environmental aspects and employees' functioning in a predictable way, providing evidence for the criterion-related validity of the scale. In line with previous research (e.g., Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008) work-related need satisfaction related positively to job resources. Specifically, as expected, task autonomy was most strongly correlated to autonomy satisfaction, whereas social support was most strongly related to relatedness satisfaction. The results of opportunities for skill utilization were less clear and rather mixed across the two samples as the relation between skill utilization and competence satisfaction was not consistently positive. A number of possible explanations can be provided to explain this unexpected result.

First, this might suggest that the competence subscale of the W-BNS leaves room for improvement. Second, from a theoretical point of view, the opportunity to use one's skills may not guarantee that one masters each of the tasks. Satisfaction of the need for competence is, however, largely dependent upon such feelings of mastery. Thus, skill utilization might yield a more distant relation to competence satisfaction: its competence-satisfying effect would, for example, depend on the novelty and difficulty of the task. This might have been particularly influential in Sample 4, which consisted predominately of employees with lower levels of education: especially for these individuals, new tasks might be too demanding to experience competence satisfaction. We would like to encourage further research to examine this issue in greater detail.

Consistent with the assumption that need satisfaction relates to both hedonic and eudaimonic well-being, as well as ill-being (Ryan & Deci, 2000; Ryan *et al.*, 2008), satisfaction of the three needs related positively to job satisfaction and vigour (i.e., the main component of work engagement) and negatively to exhaustion (i.e., the core of burnout). The positive associations between need satisfaction and well-being also emerged for the more general and domain-encompassing outcome of life satisfaction. Still, in line with our expectations, work-related need satisfaction tended to relate somewhat less strongly to life satisfaction than to the aspects of work-related well-being. The latter set of findings supports the divergent validity of the need satisfaction measure and highlights the importance of domain-specific measurements (Vallerand, 1997).

Results furthermore confirmed the hypothesized positive associations between need satisfaction, affective commitment, and performance, indicating that the beneficial effects of need satisfaction go beyond employees' well-being. Satisfaction of each of the needs also related positively to employees' autonomous motivation, whereas only autonomy satisfaction related negatively to controlled motivation. The latter finding further justifies the differentiation between the three needs and provides further evidence that the relationships between each of the three need satisfaction variables and employees' functioning are not attributable to common method-variance. Finally, need satisfaction also related to an objective indicator, that is, turnover. However, only autonomy satisfaction seemed to prevent turnover. This finding is consistent with research in other life domains, showing that autonomous functioning is associated with less school drop-out (e.g., Vallerand, Fortier, & Guay, 1997; Vansteenkiste, Zhou, Lens, & Soenens, 2005).

Limitations and suggestions for further research

Some limitations need to be acknowledged. First, the current measurement relies on employees' self-reports to assess the internal process of need satisfaction. Although the present findings indicate that impression management did not significantly bias the results, future studies might examine whether other methodological artefacts or personality factors may influence responses to the W-BNS (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Second, the present findings support the criterion-related validity of the W-BNS by means of cross-sectional associations (Hinkin, 1998) and its predictive validity regarding turnover. Future studies may further examine causal relations between work-related need satisfaction and its antecedents (e.g., leadership and remuneration systems) and consequences (e.g., productive and counterproductive behaviour) by means of longitudinal, cross-lagged, or (field-) experimental studies. Other studies might focus on intra-individual differences in need satisfaction and their correlates, for example, by using diary studies. Indeed, within individuals, day-to-day variations in

optimal functioning are likely to become prominent as a function of the degree in which altering situations satisfy the basic psychological needs (Reis *et al.*, 2000).

Third, the present study included a heterogeneous convenience sample as well as different organization-specific samples. Future research in different sectors and countries may, however, further add to the generalizability of the findings. In a first step, the present study validated the Dutch version of the scale. We hope these results may encourage future research to validate the scale in other languages.

Finally, future studies might also examine the relative contribution of each of the needs in the prediction of various outcomes. The current results indicate that all three needs associate with employees' well-being, whereas only (the lack of) autonomy satisfaction was predictive of turnover. Future research may explore whether the needs for autonomy, competence, and relatedness yield different relations with particular outcomes such that each of the needs relates to unique aspects of workers' optimal functioning (e.g., Greguras & Diefendorff, 2009). The current measure allows for testing this assumption.

Conclusions

In sum, the present results support the psychometric properties of the Dutch version of the work-related need satisfaction scale. We hope this measure may assist researchers who seek to study employees' need satisfaction. In our view, the use of a validated need satisfaction measure rather than the reliance on *ad hoc* need satisfaction measures allows for more consistent cross-study comparisons and contributes to a more unified development of this field. On the practical level, these results indicate that work-related need satisfaction versus frustration yields implications for individuals' functioning, both on the job and in general. Employees might therefore want to assess and regulate the need supportive character of their jobs and seek for environments which nourish their motivational energy and stimulate optimal functioning. Need satisfaction might be a point of interest for organizations as well, as it might be helpful in assessing and improving the motivational impact of organizational aspects such as job design (Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008). Paying attention to employees' need satisfaction might furthermore enhance employees' functioning and, therefore, help to reduce costs associated with stress or turnover, and increase productivity. We hope that the availability of a balanced, valid, and reliable measurement of need satisfaction at work stimulates work and organizational psychologists to examine these issues and to study the role of need satisfaction in the context of work in general.

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Appendix

Items	Corrected item-total correlations
<i>Need for autonomy</i>	
I feel free to express my ideas and opinions in this job*	.59
I feel like I can be myself at my job	.69
At work, I often feel like I have to follow other people's commands (R)	.61
If I could choose, I would do things at work differently (R)	.57
The tasks I have to do at work are in line with what I really want to do	.61
I feel free to do my job the way I think it could best be done	.59
In my job, I feel forced to do things I do not want to do (R)	.54
<i>Need for competence</i>	
I don't really feel competent in my job*	.46
I really master my tasks at my job	.60
I feel competent at my job	.70
I doubt whether I am able to execute my job properly*	.56
I am good at the things I do in my job	.66
I have the feeling that I can even accomplish the most difficult tasks at work	.59
<i>Need for relatedness</i>	
I don't really feel connected with other people at my job (R)	.65
At work, I feel part of a group	.63
I don't really mix with other people at my job (R)	.63
At work, I can talk with people about things that really matter to me	.63
I often feel alone when I am with my colleagues (R)	.59
At work, people involve me in social activities*	.44
At work, there are people who really understand me*	.60
Some people I work with are close friends of mine	.63
At work, no one cares about me (R)*	.59
There is nobody I can share my thoughts with if I would want to do so (R)*	.49

Note. (R) Reversed item. *Item not included in the final scale. The current study reports on the Dutch version of the W-BNS, the validity of the English version remains to be studied. The items were translated using the translation/back-translation procedure. The French version of the W-BNS is available upon request from the corresponding author.