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ORIGINAL ARTICLE

# Development and Initial Validation of the Need Satisfaction and Need Support at Work Scales: A Validity-Focused Approach

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Although the relevance of employee need satisfaction and manager need support have been examined, the integration of self-determination theory (SDT) into work and organizational psychology has been hampered by the lack of validated measures. The purpose of the current study was to develop and validate measures of employees' perception of need satisfaction (NSa-WS) and need support (NSu-WS) at work that were grounded in SDT. We used three Swedish samples (total  $N = 1,430$ ) to develop and validate our scales. We used a confirmatory approach including expert panels to assess item content relevance, confirmatory factor analysis for factorial validity, and associations with theoretically warranted outcomes to assess criterion-related validity. Scale reliability was also assessed. We found evidence of content, factorial, and criterion-related validity of our two scales of need satisfaction and need support at work. Further, the scales demonstrated high internal consistency. Our newly developed scales may be used in research and practice to further our understanding regarding how satisfaction and support of employee basic needs influence employee motivation, performance, and well-being. Our study makes a contribution to the current literature by providing (1) scales that are specifically designed for the work context, (2) an example of how expert panels can be used to assess content validity, and (3) testing of theoretically derived hypotheses that, although SDT is built on them, have not been examined before.

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**Keywords:** basic psychological needs; leadership style; instrument development; self-determination theory

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During the last decade, the interest in applying self-determination theory (SDT) to understand employee motivation and behavior at work has increased (Gagné, 2014). SDT is a theoretical framework used to understand human motivation and has previously been successfully applied in sports, school, and health care settings (Deci & Ryan, 2000; Ryan & Deci, 2017). SDT postulates that humans have three innate psychological needs—the need for autonomy, competence, and relatedness—which have to be satisfied for individuals to flourish (Deci & Ryan, 2000). Given that SDT attempts to explain how leaders influence subordinates' motivation and well-being, the potential use of applying SDT within work and organizational psychology should be considered large, and a growing number of empirical studies have shown the beneficial effects of employee need satisfaction at work (e.g., Baard, Deci, & Ryan, 2004; Hofer & Busch, 2011; Niemiec, Ryan, & Deci, 2009; Ryan & Deci, 2017).

However, the integration and application of SDT in work settings has been hampered by a lack of validated instruments for measuring need satisfaction and need

support in the workplace (Longo, Gunz, Curtis, & Farsides, 2014; Van den Broeck, Ferris, Chang, & Rosen, 2016; Van den Broeck, Vansteenkiste, & De Witte, 2010). For example, most existing scales originate from other settings, such as health care or school settings, and were not designed to capture employees' perception of their need satisfaction at work or their manager's support of their needs. Further, many of these scales are ad hoc instruments that have not been validated in the work context and include items capturing antecedents and consequences of need satisfaction and need support. Valid scales are essential for the conduct of science. Items that do not reflect the construct they intend to measure introduce random error that may result in underestimated relationships with predictors and outcomes and therefore falsely create null findings (Frost & Thompson, 2000). Even worse, items that tap into related constructs add systematic error that may bias estimates downwards or upwards, inflating the risk of not only Type 1 but also Type 2 error where false associations are found (Longo et al., 2014). The lack of validated scales therefore hinders the coherent and cumulative development of the potential benefits of need satisfaction and need support at work.

The purpose of the present study was to develop and validate measures of employees' perception of need

satisfaction and need support at work. We contribute to the existing literature in three important ways. First, we develop and validate measures of need satisfaction and need support that are specifically designed for the work context and that also overcome the shortcomings of existing instruments. Theoretically, need satisfaction and need support are assumed to exist at different levels (Vallerand, 1997), including the global level, domain level (e.g., work, education, leisure), and state level (e.g., specific task, specific period of time). Thereby, contextualized scales are essential to examine whether need satisfaction and need support at work differ from need satisfaction and need support in other domains or levels (i.e., do they have the same antecedents and consequences). In addition they enable researchers to examine whether and how need satisfaction and need support at work are related to need satisfaction and need support at other levels or in other domains, as well as whether need satisfaction and need support at work can compensate lack of the same at other levels or domains. Second, our study has a validity-focused approach and makes a methodological contribution by the use of an expert panel to ensure content validity. By calculating Aiken's (1985) item content-validity coefficient ( $V$ ) item content relevance is assessed to establish content validity, a helpful technique seldom used in work and organizational psychology. Third, given that our need support measure incorporates all three aspects of need support, we are able to examine whether each specific aspect of need support is more strongly related to its respective aspect of need satisfaction than to the other two aspects (e.g., autonomy support to autonomy need satisfaction), which is theoretically assumed but to our knowledge has never been tested. Knowledge of how specific leadership behaviors that support employee needs influence specific employee needs is of interest not only from a theoretical perspective, but also when planning and designing organizational interventions such as leadership training. Will improvements in specific need-supportive behaviors target specific needs, or does the leader have to display all three need-supportive behaviors to fulfill, for example, the need for competence? Or could increases in one need-supportive behavior such as autonomy support fulfill all three needs? Our need support scale enables us to examine these questions.

### Need Satisfaction and its Consequences

Within basic psychological needs theory (BPNT), which is one of the six mini-theories constituting the meta-theory SDT, basic psychological needs are conceptualized as "innate psychological nutriment that are essential for ongoing psychological growth, integrity, and well-being" (Deci & Ryan, 2000, p. 229). In a similar way to how meeting physical needs (e.g., hunger, thirst) is critical to one's physical survival, satisfaction of psychological needs is assumed to be critical for one's psychological functioning (Van den Broeck, Vansteenkiste, & De Witte., 2008). The need for autonomy connotes an endorsement of one's actions, flexibility, an absence of pressure, and a sense that one is engaging in the action voluntarily. The need for competence implies that a person wants to interact effectively with the environment and experience a

sense of adequate ability. Finally, the need for relatedness represents a desire to feel connected to significant others, to be cared for, and to care for others in a safe environment (Deci & Ryan, 2000). Many social-environmental as well as individual factors may influence a person's need satisfaction, but one of the most influential factors in a work setting is the support provided by the manager (Gagné & Deci, 2005).

Given that the satisfaction of the three basic psychological needs is critical for psychological growth and well-being, need satisfaction and thereby also support to satisfy the needs (i.e., need support) are expected to be linked to outcomes reflecting psychological functioning and well-being (Van den Broeck et al., 2008). In line with these theoretical assumptions, empirical studies using SDT in domains other than work settings have shown positive associations of need satisfaction and optimal functioning in terms of autonomous motivation, performance, and well-being (Ryan & Deci, 2017). The application of SDT in the context of work is not as common, but a growing number of studies have suggested that employees' perception of need satisfaction at work is related to favorable attitudes (Hofer & Busch, 2011), well-being (Baard et al., 2004; Niemiec et al., 2009), and performance (Baard et al., 2004). For example, in a study of Canadian university alumni working in both the private and public sectors, perceptions of need satisfaction at work positively predicted job satisfaction and negatively predicted emotional exhaustion, which in turn was related to turnover intentions and actual turnover one year later (Richer, Blanchard, & Vallerand, 2002). Satisfaction of the needs for autonomy, competence, and relatedness was found to increase autonomous motivation among hospital workers in psychiatric care (Lynch, Plant, & Ryan, 2005). Further, need satisfaction has also been studied in relation to the job demand and resources (JD-R) model, in which job resources are considered to have a strong motivational impact on employees (Bakker & Demerouti, 2007). Van den Broeck, Vansteenkiste, De Witte, and Lens (2008) found in a study of Belgian workers that job demands were negatively related to need satisfaction, while job resources in terms of autonomy, skill utilization, and positive feedback were positively related to need satisfaction. Further, need satisfaction positively predicted employee engagement and vigor. Based on the above, we propose:

*Hypothesis 1:* Need satisfaction is positively associated with the job resources influence, possibilities for skill development, and social support.

*Hypothesis 2:* Need satisfaction is positively associated with job satisfaction, vigor, job performance, and autonomous motivation and negatively associated with exhaustion and turnover intentions.

### Need Support and Its Consequences

The interpersonal climate in the workplace is largely affected by the manager's orientation toward employees (Gagné & Deci, 2005). Within SDT, interpersonal behaviors that directly support followers' need satisfaction are called need support (Deci & Ryan, 2000). Particularly, three types

of managerial support—autonomy, competence, and relatedness support—have been acknowledged within SDT as important for employees' need satisfaction, well-being, and performance (Gagné, 2014). Managers who support autonomy are able to understand employees' perspectives, acknowledge their feelings, encourage exploration and curiosity, provide a meaningful rationale, and provide opportunities for choice (Deci & Ryan, 2008). Competence support involves providing clear and understandable guidelines and expectations, instilling a sense of competence, and providing relevant feedback to employees (Ryan & Deci, 2017). Relatedness support is displayed when managers show a genuine interest in their employees and their employees' well-being by spending a considerable amount of time, energy, and resources on them (Niemic et al., 2006).

Based on conceptual grounds and the postulates within SDT (Deci & Ryan, 2000), it is assumed that specific aspects of need support are more strongly related to its respective aspect of need satisfaction than to the other two aspects (e.g., autonomy support to autonomy need satisfaction). For example, managers may display autonomy support by encouraging employees to explore new opportunities and to take their own initiatives, which in turn gives a sense of being autonomous. Further, by explaining why certain tasks need to be done and providing the employee with choice (i.e., autonomy support) managers fulfill the need for autonomy in terms of feelings of meaningfulness and voluntariness. In a similar vein, managers' use of competence support in terms of clear instructions, expectations, and feedback helps the employee to function more effectively at work, thereby fulfilling the need for competence. Finally, by spending time with employees and listening attentively to their problems and concerns, managers' display of relatedness support gives a sense of being understood and cared for, fulfilling the need for relatedness (Deci & Ryan, 2000). Empirical studies have suggested that managers' display of need support is an important predictor of employee need satisfaction at work (Gagné, 2014). However, due to the lack of scales that differentiate between autonomy, competence, and relatedness support at work, the proposed specific relationships have not previously been possible to examine. Based on our previous reasoning, we propose:

*Hypothesis 3:* Autonomy support is more strongly associated with autonomy need satisfaction than it is associated with the other needs (competence and relatedness).

*Hypothesis 4:* Competence support is more strongly associated with competence need satisfaction than it is associated with the other needs (autonomy and relatedness).

*Hypothesis 5:* Relatedness support is more strongly associated with relatedness need satisfaction than it is associated with the other needs (autonomy and competence).

The study of manager need support to understand the motivating impact of supervisors' leadership style at work suggests that managers' display of autonomy, competence,

and relatedness support are important predictors of employee need satisfaction at work (Gagné, 2014). For example, managerial autonomy support was related to job satisfaction and trust among service employees (Deci et al., 1989), and in a study on bank employees, autonomy support predicted employee need satisfaction, which in turn was related to performance (Bard et al., 2004). Autonomy support has also been related to autonomous motivation (Gillet, Gagné, Sauvagére, & Fouquereau, 2013), higher employee psychological health (Baard et al., 2004; Lynch et al., 2005; Moreau & Mageau, 2012), and less psychological distress (Deci et al., 2001). Need support has further been related to increased self-efficacy, which in turn predicted burnout among teachers (Fernet, Guay, Sénécal, & Austin, 2012). In addition, intervention studies suggest that it is possible to increase manager need support with training (Deci, Connell, & Ryan, 1989) and that such training can increase employees' autonomous motivation and workplace engagement (e.g., Hardré & Reeve, 2009). Finally, as outlined in the job demands and resources model (Bakker & Demerouti, 2007), job resources play a motivational role. Some resources play an intrinsic motivational role in fostering growth, development, and well-being, whereas others play an extrinsic motivation role because they are instrumental in achieving work goals. Job resources, such as influence, possibilities for skill development, and social support, as well as managerial support and feedback (e.g., need support), are hypothesized to play an intrinsic motivational role according to the job demands and resources model. In line with SDT, the job demands and resources model, and previous empirical studies, we therefore propose:

*Hypothesis 6:* Need support is positively associated with the job resources of influence, possibilities for skill development, and social support

*Hypothesis 7:* Need support is positively associated with job satisfaction, vigor, job performance, and autonomous motivation and negatively associated with exhaustion and turnover intentions.

### Existing Instruments and Their Limitations

Basic psychological needs and the managerial support that satisfies employees' needs provide a useful way to understand motivational processes and employee functioning and well-being in work settings. To gain understanding of these motivational processes and employee functioning, well-validated and context-relevant instruments that can capture these constructs are essential. A common critique against the existing work-related need satisfaction and need support scales is that they are ad hoc instruments (Van den Broeck et al., 2010; Brien et al., 2012). Examples of such instruments are the commonly used basic need satisfaction at work scale (Baard et al., 2004; Deci et al., 2001), the work climate questionnaire (Baard et al., 2004), and the interpersonal behaviors scale (Otis & Pelletier, 2005). One of the main problems with ad hoc instruments is that they have not been rigorously evaluated, and little is known about whether the items included in these instruments are relevant in the work context and meaningful for employees. Another problem with these instruments is that they in

some cases include antecedents and consequences of the constructs they are intended to measure. As such, the validity of ad hoc instruments has not been thoroughly evaluated and may be diminished because of the inclusion of antecedents and consequences.

**Need satisfaction scales.** Recently developed need satisfaction scales, such as the work-related need satisfaction scale (W-BNS; Van den Broeck et al., 2010), the basic psychological needs at work scale (BPNWS; Brien et al., 2012), and the most recent need satisfaction and frustration scale (NSFS; Longo et al., 2014), are improvements but also contain several limitations. For example, the W-BNS (Van den Broeck et al., 2010) includes items capturing antecedents of need satisfaction. In addition, many of the frustration items in the W-BNS seem to capture low levels of need satisfaction rather than need frustration, which introduces a method bias in the scale, because they are negatively phrased items of need satisfaction. One problem with mixing negatively and positively phrased items within a scale is that people interpret items differently as a consequence of negative and positive phrasing instead of the item content, for example due to individual factors (e.g., depression or mood; cf. Lindwall et al., 2012). Furthermore, need satisfaction and need frustration are theoretically viewed as two distinct constructs, not as each other's opposites on a continuum (cf. Chen et al., 2015). This view has also been supported in empirical studies showing that need satisfaction is more strongly related to well-being, whereas need frustration is more strongly related to ill-being (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Chen et al., 2015). Regarding the BPNWS (Brien et al., 2012), concerns have been raised against a tendency that the relatedness factor is decomposed into specific subcomponents (Longo et al., 2014), and some items on the autonomy factor tap into antecedents and do not really measure need satisfaction. Finally, the NSFS (Longo et al., 2014), which also includes need satisfaction and frustration items, was developed in an educational context with student samples. Although the factor structure was also examined in a convenience sample of employees, the NSFS items are domain general and not work specific.

**Need support scales.** The available need support scales (e.g., the interpersonal behaviors scale, the work climate questionnaire) are, as previously mentioned, ad hoc instruments that have not formally been validated. For example, the work climate questionnaire was originally developed in a health-care context and merely adapted (reworded) to work settings (e.g., Baard et al., 2004). More recently, Moreau and Mageau (2012) developed the perceived autonomy support scale for employees (PASS-E). However, this scale is also an ad hoc scale based on the perceived parental autonomy support scale (Mageau et al., 2011), and it only measures employees' perceptions of their managers' autonomy support. No previous scale properly reflects the assumptions of SDT by including all three aspects of need support at work: autonomy, competence, and relatedness support.

Besides the limitations of the existing need satisfaction and need support scales described above, many of

these scales have been developed solely in convenience samples, such as student samples, or in a narrow range of professions, which limits the generalizability of findings derived from studies using these instruments (Peterson, 2001).

## The Present Study

Following the tenets within BPNT and SDT that manager need support influences employee need satisfaction, which in turn leads to favorable outcomes (Gagné & Deci, 2005), the purpose of the present study was to develop work-related scales to measure employee need satisfaction at work and manager need support. We accounted for several of the limitations in the available scales by using a confirmatory and validity-focused approach and by using a representative sample from the working population in the development of these two scales specifically for the work context. The scale development consisted of five phases based on the procedures proposed by DeVellis (2011), Hinkin (1998), and Clark and Watson (1995). Phase 1 consisted of item generation and initial item selection. In Phase 2, content validity of the items in the initial item pool was assessed by an expert panel. Phase 3 consisted of item selection, data collection, and initial evaluation of the hypothesized three-factor structures. In Phase 4, the obtained factor structure was cross-validated and replicated in a representative sample of workers in Sweden. Finally, in Phase 5, we examined the criterion-related validity of the two scales.

## Method

### Procedure and Participants

We used three samples (total  $N = 1,430$ ) throughout the validation of our measures of need satisfaction and need support. Sample 1 consisted of 186 employees at a paper pulp factory in Sweden. All employees were invited to participate in the study. The introductory letter of the paper-and-pencil survey explained that participation in the research study was voluntary and anonymous. A total of 230 employees were invited, yielding a response rate of 81%. Sample 2 included 426 managers and employees in elderly care working in home help services in a larger municipality in Sweden. Invitations to participate in the study were distributed through senior management to first-line managers and employees. Although we cannot say whether all employees actually received an invitation, the organization employs 1,293 employees, giving a response rate of 33%. Sample 3 comprised a national representative sample with randomly selected participants. The data were collected by Statistics Sweden in order to assure generalizability to the working population in Sweden. Paper-and-pencil surveys were sent home to participants' home address with a prepaid return envelope (to Statistics Sweden). Out of 2,000 invited participants, 818 answered the questionnaire, and after exclusion of 93 respondents who were no longer working, the final response rate was 43%. An overview of how the samples were used throughout the five phases, which variables were assessed and when, and demographic characteristics is presented in **Table 1**. Approval from the Regional Ethical

Review Board was obtained prior to data collection (ref nr: 2013/467-31Ö).

### Measures

Need satisfaction was measured with the newly developed 13-item Need Satisfaction at Work Scale (NSa-WS). This instrument consists of three subscales designed to measure satisfaction of the need for autonomy (four items), the need for competence (four items), and the need for relatedness (five items) in work contexts. Responses were given on a 5-point Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*).

Need support was assessed with the newly developed 12-item Need Support at Work Scale (NSu-WS). This instrument consists of three subscales capturing employees' perceptions of their managers' autonomy support (four items), competence support (four items), and relatedness support (four items). Responses were given on a 5-point Likert-scale ranging from 1 (*never/almost never*) to five (*always*). The need satisfaction and need support items are presented in **Figures 1** and **2**.

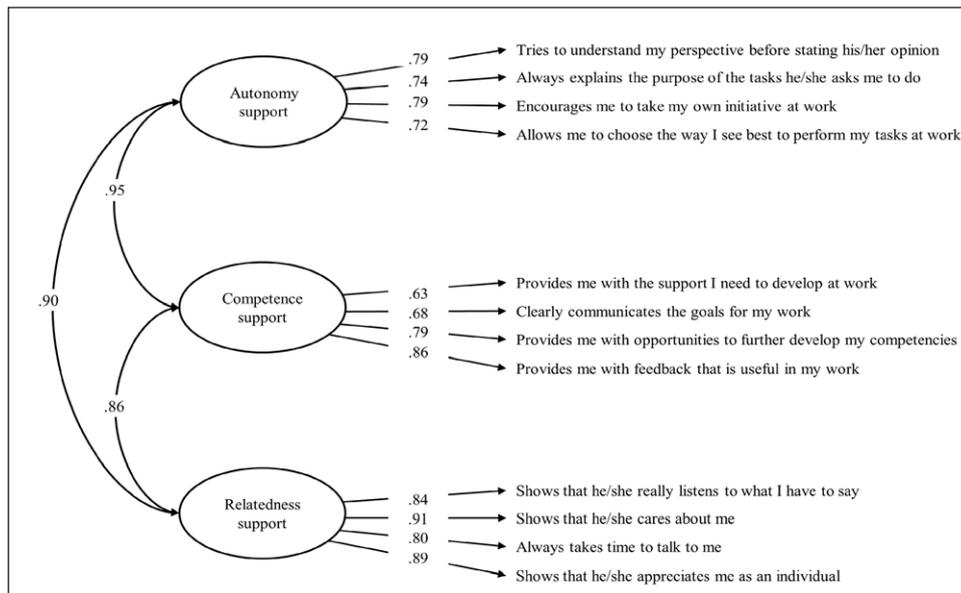
Job resources were measured with three subscales: influence (four items, e.g., Do you have a large degree of influence concerning your work?), possibilities for skill development (four items, e.g., Do you have the possibility of learning new things through your work?), and social support from colleagues (three items, e.g., How often do you get help and support from your colleagues?), from the second version of the Copenhagen Psychosocial Questionnaire (COPSOQ II; Pejtersen, Søndergård Kristensen, Borg, & Bue Bjorner, 2010). Responses on the influence scale were given on a 5-point Likert scale ranging from 1 (*never/hardly ever*)

to 5 (*always*). On the possibilities for skill development, scale responses were given on a 5-point Likert scale from 1 (*to a very small extent*) to 5 (*to a very large extent*). Responses on the social support scale were given on a 4-point Likert scale from 1 (*never/hardly ever*) to 4 (*always*).

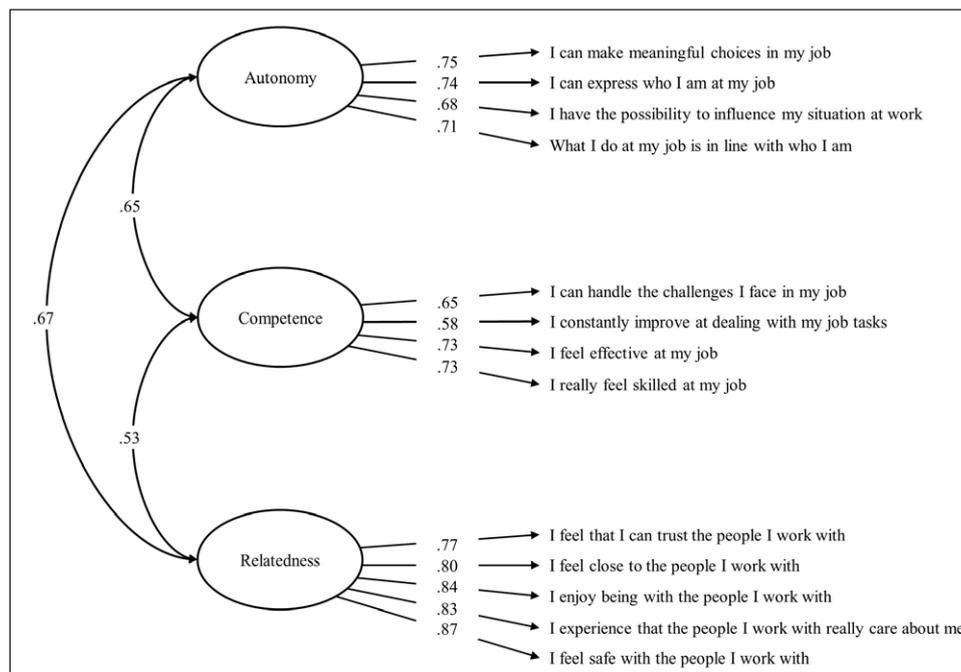
Job satisfaction (e.g., How pleased are you with your work prospects?) was measured with a four-item scale from COPSOQ II (Pejtersen et al., 2010). Responses were given on a 5-point Likert scale from 1 (*to a very small extent*) to 5 (*to a very large extent*). Vigor (e.g., At my work, I feel like I am bursting with energy) was assessed with a three-item scale from the short version of the Utrecht Work Engagement Scale (Schaufeli, Bakker, & Salanova, 2006). Responses were given on a 7-point Likert-scale from 0 (*never*) to 6 (*always/every day*). Exhaustion (e.g., Do you feel worn out at the end of the work day?), which is considered as the core aspect of burnout, was measured with the seven-item work-related scale from the Copenhagen Burnout Inventory (CBI; Kristensen, Borritz, Viladsen, & Kristensen, 2005). Responses were given on a 5-point Likert scale ranging from 1 (*never/almost never or to a very low degree*) to 5 (*always/to a very high degree*). Turnover intentions were measured with a three-item scale from Sjöberg and Sverke (2000). Responses were given on a 5-point Likert scale ranging from 1 (*not at all true of me*) to 5 (*completely true of me*). Job performance was assessed with a single item from the World Health Organization Health and Work Performance Questionnaire (HPQ; Kessler et al., 2003). Participants were asked to rate their overall work performance during the last four weeks and responded on a scale of 0 (*worst possible work performance*) to 10 (*top work performance*).

**Table 1:** Overview and Demographic Characteristics of the Study Samples.

	Sample 1	Sample 2	Sample 3
N	186	426	818
Gender			
Male (%)	76	11	43
Female (%)	24	89	57
Age			
Range	20–64	20–65	21–66
Mean	46.75	44.03	46.31
SD	10.59	12.11	11.93
Education			
Primary school, ages 7–16 (%)	16	7	8
Upper secondary school, ages 17–19 (%)	51	55	40
University (%)	33	38	47
<b>Tenure</b>			
Range	1 month to 44 years	2 months to 34 years	1 month to 45 years
Mean (years)	20.25	8.21	9.97
SD (years)	13.75	7.10	10.05
Hours worked			
Full-time (%)	99	43	81
Part-time (%)	1	57	19
Contract			
Permanent (%)	94	90	89
Temporary (%)	6	10	11
Phase 1: Item generation	x	x	
Phase 2: Assessment of content validity	x	x	
Phase 3: Item selection and factorial validity	x	x	
Phase 4: Replication			x
Phase 5: Criterion-related validity			x



**Figure 1:** Factor structure of the NSu-WS. The two scales have been validated in Swedish and later translated into English by the research group in collaboration with a bilingual expert.



**Figure 2:** Factor structure of the NSa-WS.

Autonomous motivation was measured with six items from the identified subscale (e.g., Because I personally consider it is important to put effort into this job) and intrinsic subscale (e.g., Because the work I do is interesting) of the Multidimensional Work Motivation Scale (MAWS; Gagné et al., 2015). The items were preceded by the stem “Why do you or would you put efforts into your current job?” and responses were given on a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*completely*).

**Results**

**Phase 1: Item Generation**

The overall aim of Phase 1 was to develop an extensive battery of items that would reflect the breadth of the theorized content domains of interest, need satisfaction

and need support. In line with Clarke and Watson (1995), we conducted a comprehensive literature review to make sure that our item pool would be broader than our own theoretical view of the target constructs. Based on this literature review, we then defined our constructs and developed a large pool of items that reflected the three subdimensions of need satisfaction and need support. Drawing on the work by DeVellis (2011), Hinkin (1998), and Clark and Watson (1995), we strived to develop items that were, positively worded, as simple and short as possible, contained no double meaning or redundancy, and did not reflect antecedents or consequences of need satisfaction or need support. All items were formulated as declarative statements. At this stage, the item pool consisted of 49

items reflecting need satisfaction and 57 items reflecting need support.

### Phase 2: Assessment of Content Validity

In the second phase, we assessed the content validity of our items by using the procedures recommended by Dunn, Bouffard, and Rogers (1999). One central aspect of content validity is item content relevance, which reflects the degree to which the content contained within an item is representative of the construct that the item is designed to measure (Dunn et al., 1999). Item content relevance is assessed by using an expert panel consisting of expert judges including stakeholders from both research and practice, in our case researchers, consultants, employees, and managers, who were invited to review the items. Although this is an important aspect of scale development and is recommended by the American Psychological Association (2014), it is often overlooked in applied research (Dunn et al., 1999).

In our expert panel, a total of 22 experts/judges, including four researchers who had published SDT-related articles, eight consultants, six employees, and four managers agreed to participate. The members of the expert panel were asked to indicate the degree to which each of the 49 items of need satisfaction and 57 items of need support were aligned with the definitions of the constructs on a 5-point Likert scale (1 = *poor match*; 2 = *fair match*; 3 = *good match*; 4 = *very good match*; 5 = *excellent match*). Reviewers were not given information on which subscale the items were intended to reflect, and they were given the opportunity to provide typed feedback on item wording or other concerns.

Following Dunn et al.'s (1999) suggestions, we inspected mean content relevance in terms of mean values for all items. Items that scored over 4 (*very good match*) on their designated subscale and less than 3 (*good match*) on any other subscale were kept for further analysis. We used Aiken's (1985) item content-validity coefficient ( $V$ ) to determine whether an item was relevant to a construct.  $V$  can range from 0 to 1, with a value of 0 indicating that all reviewers gave the lowest possible rating (i.e., 1, or *poor match*) with a value of 1 showing that all reviewers gave the highest possible rating (i.e., 5, or *excellent match*). With 22 reviewers,  $V$  values larger than .64 were considered as a statistical effect at  $p < .05$  (Aiken, 1985). We also calculated Cohen's (1977) effect size indices for dependent means to assess the extent to which the items were relevant to only a single construct. This index designates the magnitude of the difference between the mean ratings associated with two different constructs on the same item. Following the recommendation of Dunn et al. (1999), a large effect size (.80) needed to be observed in order for an item to be judged as relevant only to a single construct. After assessment of mean content relevance, an item validity coefficient  $> .64$ , and Cohen's effect size  $> .80$ , as well as for substantive and theoretical meaning, we chose to retain 39 items of need satisfaction and 40 items of need support for further analysis. Information regarding mean content relevance, item validity coefficients, and Cohen's effect size for all items is available from the authors upon request.

### Phase 3: Item Selection and Factorial Validity

Next, data on the 39 need satisfaction and 40 need support items were collected from Samples 1 and 2. Initial item inspection and selection were based on item mean, variance, skewness, kurtosis, inter-item correlations, and inter-scale correlations. Items with a mean centering around three, a relatively large variance ( $SD > 0.50$ ), skewness and kurtosis between  $-1$  and  $1$  (Muthén & Kaplan, 1985), and relatively large item-scale ( $> .30$ ) and inter-item correlations (between  $.15$  and  $.50$ ) were selected and retained for further analysis (Clark & Watson, 1995; DeVellis, 2011; Hinkin, 1998). Following this initial item selection, confirmatory factor analysis (CFA) was performed and further item evaluation was conducted based on substantive and theoretical meaning, model fit, factor loadings ( $\approx .50$ ), and  $R^2$  ( $\approx .50$ ). In addition, we used modification indices (MI) to identify items that displayed substantial cross-loadings or residual correlations with other items. The MI provides an approximation of how much the overall  $\chi^2$  will decrease if a fixed or constrained parameter (e.g., a cross-loading or correlated residual) is estimated freely (Brown & Moore, 2012). The MI can be conceptualized as a  $\chi^2$  statistic with 1 *df*; as such, a critical value of 3.84 is statistically significant at  $p < .05$ . We inspected suggested cross-loadings and correlated residuals with MI values equal to or larger than 10 (the default in Mplus) because these are more likely to reflect changes that will substantially improve the model fit. Items with large MI values, which suggests a substantial cross-loading or residual correlation, were excluded from further analysis. Items that were excluded displayed MI values around 50 and above. In total, we retained 13 need satisfaction and 12 need support items for the final models.

The CFA models were estimated using the software Mplus version 7.3 (Muthén & Muthén, 1998–2012) and a robust maximum likelihood estimator (MLR in Mplus). The chi-square test of exact fit is known to be oversensitive to sample size and minor model misspecifications (Marsh, Hay, & Grayson, 2005). We therefore relied on goodness-of-fit indices to evaluate the models. Conventional cut-off criteria ( $CFI > .90$ ,  $SRMR$  and  $RMSEA < .08$ ) were used to evaluate model fit. The fixed factor method (factor variances constrained to 1.0) was employed to set the scale of the latent variables (Little, 2013). CFAs were performed on the two scales, and both the need satisfaction scale,  $\chi^2(62) = 166.90$ ,  $p < .001$ ,  $CFI = .96$ ,  $SRMR = .04$ ,  $RMSEA = .05$ , 90% CI [.04, .06], and need support scale,  $\chi^2(51) = 193.534$ ,  $p < .001$ ,  $CFI = .96$ ,  $SRMR = .03$ ,  $RMSEA = .07$ , 90% CI [.06, .08], displayed an acceptable model fit. We use the omega coefficient ( $\omega$ ) to assess internal consistency as it makes fewer and more realistic assumptions than coefficient alpha (McDonald, 1999), particularly the assumption of an underlying tau-equivalent reliability model (see Dunn, Baguley, & Brunnsden, 2014, for an overview). Internal consistency of the need satisfaction subscales was .78 for autonomy, .81 for competence, and .89 for relatedness. Internal consistency of the three need support subscales was .86 for autonomy support, .90 for competence support, and .92 for relatedness support.

**Phase 4: Cross-Validation**

In this next phase, the final models were cross-validated and replicated in a national representative sample drawn from the working population in Sweden (Sample 3). We performed cross-validation and replication to further examine the validity in the final models obtained in Phase 3 and to avoid capitalization on chance due to single-sample analyses (Boomsma, 2000). The three-factor models displayed adequate model fit: need satisfaction,  $\chi^2(62) = 198.43, p < .001, CFI = .97, SRMR = .04, RMSEA = .05, 90\% CI [.04, .06]$ , and need support,  $\chi^2(51) = 320.04, p < .001, CFI = .95, SRMR = .03, RMSEA = .08, 90\% CI [.07, .09]$ .

To further examine dimensionality in the constructs, we also estimated alternative one- and two-factor models (see **Table 2**), which in comparison to the hypothesized three-factor model provide information about discriminant validity. We used the scaled chi-square difference test (Satorra & Bentler, 2010; see also [www.statmodel.com](http://www.statmodel.com)), Akaike's Information Criterion (AIC), and Bayesian Information Criterion (BIC) to compare the one- and two-factor models against the hypothesized three-factor model (West, Taylor, & Wu, 2012). As seen in **Table 2**, the chi-square difference tests indicated that all of the alternative one- or two-factor models had a worse model fit than the three-factor model for both need satisfaction and need support. These results were corroborated by lower AIC and BIC values for the three-factor models compared to the one- and two-factor models. These results indicate that a three-factor model of need satisfaction and a three-factor model of need support provided the best fit to the data.

Internal consistency ( $\omega$ ) of the need satisfaction subscales was .83 for autonomy, .77 for competence, and .91 for relatedness. Internal consistency ( $\omega$ ) of the three need support subscales was .85 for autonomy support, .87 for competence support, and .92 for relatedness support. The factor loadings for the final models are displayed in **Figures 1 and 2**. Also, all final items including instructions

to the participants, the complete item formulation, and scale anchors are presented in the Appendix.

**Phase 5: Criterion-Related Validity**

In the final phase, again using Sample 3, we assessed criterion-related validity by examining the association between the need satisfaction and need support scales as well as their associations with job resources and employee functioning (see **Tables 3 and 4**). The latent variable correlations displayed in **Table 3** were calculated by adding each outcome separately to the measurement models of need support and need satisfaction. As seen in **Table 3**, autonomy, competence, and relatedness need satisfaction was positively associated with influence, skill development, and social support, supporting Hypotheses 1. In line with Hypothesis 2, autonomy, competence, and relatedness need satisfaction was also positively associated with job satisfaction, vigor, job performance, and autonomous motivation and negatively associated with exhaustion and turnover intentions. The three basic needs were all positively associated with the three need support variables (**Table 4**). To further examine these associations, we compared the correlations between matched associations with unmatched associations (e.g., managers' autonomy support ↔ autonomy need satisfaction vs. managers' autonomy support ↔ competence need satisfaction) following the procedures outlined by Steiger (1980). We expected a statistically significant difference between the matched associations and the unmatched associations in that the matched associations would be stronger (**Table 4**). In line with Hypothesis 3, the matched correlation between managers' autonomy support and autonomy need satisfaction was stronger compared to the unmatched correlations. However, in contrast to Hypothesis 4 and 5, no statistical difference was observed for the remaining associations. Finally, as seen in **Table 3**, autonomy, competence, and relatedness support were positively associated with influence, skill development, and social support, supporting Hypotheses

**Table 2:** Model Fit of Alternative One- and Two-factor Models and the Hypothesized Three-Factor Models.

Model	$\chi^2$	df	p	RMSEA [90%CI]	CFI	SRMR	AIC	BIC	$\Delta\chi^2$	$\Delta df$
<b>Need satisfaction</b>										
One-factor model	1010.29	65	.001	.13 [.13, .14]	.77	.10	22200.23	22383.56	638.25 <sup>b</sup>	3
Autonomy-Competence <sup>a</sup>	424.82	64	.001	.08 [.08, .09]	.91	.05	21450.67	21638.70	179.26 <sup>b</sup>	2
Autonomy-Relatedness <sup>a</sup>	686.82	64	.001	.11 [.10, .12]	.85	.08	21778.46	21966.49	458.47 <sup>b</sup>	2
Competence-Relatedness <sup>a</sup>	635.28	64	.001	.11 [.10, .11]	.86	.09	21721.19	21909.22	321.41 <sup>b</sup>	2
Three-factor model	198.43	62	.001	.05 [.04, .06]	.97	.04	21164.13	21361.56		
<b>Need support</b>										
One-factor	567.35	54	.001	.11 [.10, .12]	.91	.04	22162.53	22331.67	228.31 <sup>b</sup>	3
Autonomy-Competence support <sup>a</sup>	342.41	53	.001	.08 [.07, .09]	.95	.04	21861.62	22035.46	20.91 <sup>b</sup>	2
Autonomy-Relatedness support <sup>a</sup>	468.25	53	.001	.10 [.09, .11]	.92	.04	22026.81	22200.65	151.64 <sup>b</sup>	2
Competence-Relatedness support <sup>a</sup>	545.32	53	.001	.11 [.10, .12]	.91	.04	22134.94	22308.78	198.87 <sup>b</sup>	2
Three-factor model	320.04	51	.001	.08 [.07, .09]	.95	.03	21832.46	22015.69		

Note. <sup>a</sup> Items for these two factors were combined into a single latent factor. <sup>b</sup> Scaled chi-square difference test against the hypothesized three-factor model. All comparisons were statistically significant at alpha = .001.

**Table 3:** Latent Variable Correlations ( $\Phi$ ) and Omega Coefficients ( $\omega$ ) for the Study Variables ( $N = 816$ ).

	Need for autonomy	Need for competence	Need for relatedness	Autonomy support	Competence support	Relatedness support	Omega ( $\omega$ )
Job resources							
1. Influence	.85	.37	.45	.59	.55	.45	.86
2. Skills	.78	.41	.48	.52	.57	.38	.84
3. Social support	.57	.39	.79	.56	.54	.53	.75
Optimal functioning							
5. Job satisfaction	.69	.44	.53	.57	.62	.50	.80
6. Vigor	.62	.51	.44	.44	.44	.39	.90
7. Exhaustion	-.53	-.42	-.44	-.44	-.45	-.41	.89
8. Turnover intention	-.59	-.36	-.50	-.50	-.53	-.45	.80
9. Job performance	.39	.56	.33	.28	.27	.31	.84
10. Autonomous motivation	.69	.41	.43	.42	.45	.39	.85

Note. All correlations were  $p < .001$ .

**Table 4:** Differences Between the Correlations of Need Support and Need Satisfaction ( $N = 816$ ).

			z-score	$p^a$
NSa $\leftrightarrow$ BNa ( $\Phi = .68$ )	vs.	NSc $\leftrightarrow$ BNa ( $\Phi = .63$ )	6.08	.000
NSa $\leftrightarrow$ BNa ( $\Phi = .68$ )	vs.	NSr $\leftrightarrow$ BNa ( $\Phi = .57$ )	9.34	.000
NSc $\leftrightarrow$ BNc ( $\Phi = .30$ )	vs.	NSa $\leftrightarrow$ BNc ( $\Phi = .31$ )	-0.95	.172
NSc $\leftrightarrow$ BNc ( $\Phi = .30$ )	vs.	NSr $\leftrightarrow$ BNc ( $\Phi = .32$ )	-1.14	.128
NSr $\leftrightarrow$ BNr ( $\Phi = .51$ )	vs.	NSa $\leftrightarrow$ BNr ( $\Phi = .51$ )	0.00	.500
NSr $\leftrightarrow$ BNr ( $\Phi = .51$ )	vs.	NSc $\leftrightarrow$ BNr ( $\Phi = .50$ )	0.63	.264

Note. BNa = need satisfaction autonomy, BNc = need satisfaction competence, BNr = need satisfaction relatedness, NSa = autonomy need support, NSc = competence need support, NSr = relatedness need support.

<sup>a</sup>One-tailed  $p$ -value.

6. In addition, autonomy, competence, and relatedness support were positively associated with job satisfaction, vigor, job performance, and autonomous motivation and negatively associated with exhaustion and turnover intentions, supporting Hypothesis 7.

## Discussion

The purpose of the present study was to develop and validate measures of employees' perception of need satisfaction and need support at work. Using SDT as a theoretical framework (Deci & Ryan, 2000; Ryan & Deci, 2017), the Need Satisfaction at Work Scale (NSa-WS) includes 13 items and three subscales reflecting satisfaction of the basic psychological needs for autonomy (four items), competence (four items), and relatedness (five items). The Need Support at Work Scale (NSu-WS) includes 12 items that measure need support from managers, divided into three separate scales for autonomy support (four items), competence support (four items), and relatedness support (four items). CFAs supported the hypothesized three-factor model of need satisfaction and the hypothesized three-factor model for perceived need support from managers. In the present study, we also examined aspects of construct validity, and the results supported the content, factorial, and criterion-related validity of the scores derived from the NSa-WS and NSu-WS. Further, we also found evidence of high internal consistency in the subscales of our two measures.

An important feature of the NSa-WS and NSu-WS is that they were developed specifically for the work context. A majority of previous research has employed domain-general scales of need satisfaction and need/autonomy support. Our newly developed scales enable researchers to study need satisfaction and support at work with items that are relevant in the work context and meaningful to employees and, therefore, have a better chance of generating reliable and valid scores of employee need satisfaction and need support at work.

The present study also makes a methodological contribution by the use of expert panels to examine the content validity of the scales. The experts, including 22 researchers, consultants, employees, and managers, helped us to reduce our item pool considerably, assured the content validity of our remaining items and made sure that items would be meaningful and relevant to those who in the end would use our scales. In line with Dunn et al. (1999), we recommend that researchers assess item content relevance when developing, revising, and validating scales and items. Careful consideration and documentation of the following before engaging in content-coverage assessment is essential to obtain a standardized, rigorous, and replicable assessment: (a) the characteristics of the potential expert judges, (b) the number of expert judges, (c) the procedures used by the expert judges to rate item content relevance, (d) the statistical analysis used to assess the judges' ratings, and

(e) the selection criteria used to select, discard, or modify items before a final set is chosen.

The associations of the need satisfaction and need support scales with job resources and employee functioning provided evidence of criterion-related validity in the scales. Specific to Hypothesis 3, autonomy need satisfaction was, as expected, more strongly related to perceptions of managers' autonomy support compared to perceptions of competence and relatedness support. However, contrary to Hypotheses 4 and 5, this pattern was not observed for competence or relatedness need satisfaction and competence and relatedness support, respectively. It is postulated within SDT that when people experience competence and relatedness need satisfaction with respect to a behavior, they tend to internalize its value and regulation; however, autonomy need satisfaction is crucial for the behavior to be autonomously regulated (Gagné & Deci, 2005). These unique features of the need for autonomy related to the internalization process may be an explanation why autonomy need satisfaction and autonomy support displayed the expected pattern, whereas competence and relatedness did not. Although not all of our initial expectations were supported, we consider it to be a strength of our study that we examined not only general relationships, but also theoretically derived hypotheses about differences in specific relationships between need satisfaction and need support in the work context. These types of specific and testable hypotheses may shed some light on domain-specific, as well as need-specific, associations as proposed within the SDT framework (Vallerand, 1997).

In line with Van den Broeck et al. (2010), job resources were positively associated with need satisfaction, supporting Hypothesis 1, as well as with need support, supporting Hypothesis 6. In addition, we found the expected associations between the need satisfaction and need support variables and employee functioning (Hypotheses 2 and 7). Cronbach and Meehl (1955) proposed that a fundamental part of construct validation is to establish a nomological network in which the variables under study occur. Specifically, they argued that "A rigorous (though perhaps probabilistic) chain of inference is required to establish a test as a measure of a construct. To validate a claim that a test measures a construct, a nomological net surrounding the concept must exist" (Cronbach & Meehl, 1955, p. 291). Our findings are in line with previous suggestions of the nomological network surrounding need satisfaction and need support, in terms of both positive associations and negative associations, and lend initial support for the nomological network when measuring need satisfaction and need support at work with the NSa-WS and NSu-WS. Future research should also establish a nomological network for the dark side of these concepts, in terms of need frustration, need thwarting, and controlling leadership in work and organizational contexts (cf. Deci, Olafsen, & Ryan, 2017). Theoretically, need frustration, for example, is proposed to represent something else than just low levels of need satisfaction (Deci et al., 2017; Vansteenkiste & Ryan, 2013). Although these dark side aspects were not included in our scales,

we consider it of importance in future studies to compare the brighter and darker sides of leadership and basic psychological needs to get a fuller understanding of their relative prevalence at work and how they may interact in their influence on employee well-being and performance.

### **Strengths and Limitations**

This research has several strengths, including the careful creation of items, the use of an expert panel to assess content validity, a national representative sample for cross-validation and replication of the factor structure, and a thorough examination of theoretically derived hypotheses about the differential relationships between need satisfaction, need support, and various outcomes.

In terms of limitations, the present study relied on cross-sectional survey data, which pose threats to internal validity and causal inference in terms of common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Even though the use of similar methods to measure both independent and dependent variables may not necessarily upwardly bias the observed relationships between independent and dependent variables (Conway & Lance, 2010), using objective outcomes measures for the assessment of criterion validity could be one way to improve criterion validity and diminish the threat of common method bias in future research.

In an effort to further validate our scale of need support, it would also be of interest to examine to what extent need support explains variance in outcomes over and above that of other leadership behaviors such as transformational leadership, leader-member exchange (LMX), and supervisor support.

Similar to previous multidimensional leadership scales (e.g., van Knippenberg & Sitkin, 2013), the three need support dimensions were highly interrelated ( $\Phi = .86-.95$ ), indicating a high degree of overlap. We are not the first to observe high factor correlations within multidimensional SDT need support scales (e.g., Niemiec et al., 2006), and it has been proposed that these three need support dimensions are highly interrelated (Ryan, 1991). One potential explanation for the high interrelationship between need support dimensions is that managers who are need supportive with regard to one dimension (e.g., autonomy support) also are need supportive with regard to the other dimensions. This explanation has been put forward in transformational leadership research, where high factor correlations are commonly observed in research using self-report measures (Barling, Christie, & Hopton, 2011). The respondents may not be able to distinguish between items intended to capture these various dimensions of leadership; therefore, other types of data collection could be useful, such as observations of leadership behaviors (e.g., Haerens et al., 2013) when managers interact with their employees. The ability to empirically distinguish multidimensional constructs would allow us to explore whether these leadership dimensions truly are additive, which is assumed when sum scores of need support are used, or whether their relationships have other forms (cf. van Knippenberg & Sitkin, 2013). In order to investigate various hypotheses regarding different leadership dimensions in relation to employee outcomes, which is called for in the literature

(e.g., van Knippenberg & Sitkin, 2013), it is imperative that the three need support dimensions be empirically distinguishable. This is an important avenue of future research with our need support instrument.

### Conclusion

SDT offers a framework for understanding when and why employees will be engaged, feel motivated, and thrive at work, and within this theory, need satisfaction and need support are highlighted as key facilitators of employees' well-being and functioning. Our two instruments provide researchers and organizations with a means to assess the extent to which employees experience fulfillment of the needs for autonomy, competence, and relatedness at work and whether their manager support these three needs or not. The present study demonstrates that the NSa-WS and NSu-WS generate scores of employee need satisfaction and need support at work that are reliable and valid. However, construct validation is an ongoing process, and future studies, preferably with longitudinal or experimental designs, as well as cross-cultural comparisons to examine equivalence across different languages, are needed to further validate these two scales.

### Additional File

The additional file for this article can be found as follows:

- **Appendix.** The Need Satisfaction at Work Scale and the Need Support at Work Scale. DOI: <https://doi.org/10.16993/sjwop.30.s1>

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### Competing Interests

The authors have no competing interests to declare.

### References

- Aiken, L. R.** (1985). Three coefficients for analyzing the reliability and validity of ratings. *Educational and Psychological Measurement*, 45(1), 131–142. DOI: <https://doi.org/10.1177/0013164485451012>
- American Psychological Association.** (2014). *The standards for educational and psychological testing*. Washington, DC: Author.
- Baard, P. P., Deci, E. L. & Ryan, R. M.** (2004). Intrinsic need satisfaction: A motivational basis of performance and well-being in two work settings. *Journal of Applied Social Psychology*, 34(10), 2045–2068. DOI: <https://doi.org/10.1111/j.1559-1816.2004.tb02690.x>
- Bakker, A. B. & Demerouti, E.** (2007). The job demands–resources model: State of the art. *Journal of Managerial Psychology*, 22, 309–328. DOI: <https://doi.org/10.1108/02683940710733115>
- Barling, J., Christie, A. & Hopton, C.** (2011). Leadership. In: Zedeck, S. (Ed.), *Handbook of industrial and organizational psychology*, 183–240. Washington, DC: American Psychological Association. DOI: <https://doi.org/10.1037/12169-007>
- Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A. & Thøgersen-Ntoumani, C.** (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin*, 37(11), 1459–1473. DOI: <https://doi.org/10.1177/0146167211413125>
- Boomsma, A.** (2000). Reporting analyses of covariance structures. *Structural Equation Modeling: A Multidisciplinary Journal*, 7(3), 461–483. DOI: [https://doi.org/10.1207/S15328007SEM0703\\_6](https://doi.org/10.1207/S15328007SEM0703_6)
- Brien, M., Forest, J., Mageau, G. A., Boudrias, J. S., Desrumaux, P., Brunet, L. & Morin, E. M.** (2012). The basic psychological needs at work scale: Measurement invariance between Canada and France. *Applied Psychology: Health and Well-Being*, 4(2), 167–187. DOI: <https://doi.org/10.1111/j.1758-0854.2012.01067.x>
- Brown, T. A. & Moore, M. T.** (2012). Confirmatory factor analysis. In: Hoyle, R. (Ed.), *Handbook of structural equation modeling*, 361–379. New York, NY: Guilford Press.
- Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., Verstuyf, J., et al.** (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion*, 39(2), 216–236. DOI: <https://doi.org/10.1007/s11031-014-9450-1>
- Clark, L. A. & Watson, D.** (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment*, 7(3), 309. DOI: <https://doi.org/10.1037/1040-3590.7.3.309>
- Cohen, J.** (1977). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Erlbaum.
- Conway, J. M. & Lance, C. E.** (2010). What reviewers should expect from authors regarding common method bias in organizational research. *Journal of Business and Psychology*, 25(3), 325–334. DOI: <https://doi.org/10.1007/s10869-010-9181-6>
- Cronbach, L. J. & Meehl, P. E.** (1955). Construct validity in psychological tests. *Psychological Bulletin*, 52(4), 281–302. DOI: <https://doi.org/10.1037/h0040957>
- Deci, E. L., Connell, J. P. & Ryan, R. M.** (1989). Self-determination in a work organization. *Journal of Applied Psychology*, 74, 580–590. DOI: <https://doi.org/10.1037/0021-9010.74.4.580>
- Deci, E. L., Olafsen, A. H. & Ryan, R. M.** (2017). Self-determination theory in work organizations: the state of a science. *Annual Review of Organizational Psychology and Organizational Behavior*, 4, 19–43. DOI: <https://doi.org/10.1146/annurev-orgpsych-032516-113108>
- Deci, E. L. & Ryan, R. M.** (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination

- of behavior. *Psychological Inquiry*, 11, 227–268. DOI: [https://doi.org/10.1207/S15327965PLI1104\\_01](https://doi.org/10.1207/S15327965PLI1104_01)
- Deci, E. L. & Ryan, R. M.** (2008). Facilitating optimal motivation and psychological well-being across life's domains. *Canadian Psychology*, 49, 14–23. DOI: <https://doi.org/10.1037/0708-5591.49.1.14>
- Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J. & Kornazheva, B. P.** (2001). Need satisfaction, motivation, and well-being in the work organizations of a former eastern bloc country: A cross-cultural study of self-determination. *Personality and Social Psychology Bulletin*, 27(8), 930–942. DOI: <https://doi.org/10.1177/0146167201278002>
- DeVellis, R. F.** (2011). *Scale development* (3rd ed.). Thousand Oaks, CA: SAGE Publications, Inc.
- Dunn, J. G., Bouffard, M. & Rogers, W. T.** (1999). Assessing item content-relevance in sport psychology scale-construction research: Issues and recommendations. *Measurement in Physical Education and Exercise Science*, 3(1), 15–36. DOI: [https://doi.org/10.1207/s15327841mpee0301\\_2](https://doi.org/10.1207/s15327841mpee0301_2)
- Dunn, T. J., Baguley, T. & Brunson, V.** (2014). From alpha to omega: A practical solution to the pervasive problem of internal consistency estimation. *British Journal of Psychology*, 105(3), 399–412. DOI: <https://doi.org/10.1111/bjop.12046>
- Fernet, C., Guay, F., Senécal, C. & Austin, S.** (2012). Predicting intraindividual changes in teacher burnout: The role of perceived school environment and motivational factors. *Teaching and Teacher Education*, 28(4), 514–525. DOI: <https://doi.org/10.1016/j.tate.2011.11.013>
- Frost, C. & Thompson, S. G.** (2000). Correcting for regression dilution bias: Comparison of methods for a single predictor variable. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 163(2), 173–189. DOI: <https://doi.org/10.1111/1467-985X.00164>
- Gagné, M.** (2014). *The Oxford handbook of work engagement, motivation, and self-determination theory*. New York, NY: Oxford University Press. DOI: <https://doi.org/10.1093/oxfordhb/9780199794911.001.0001>
- Gagné, M. & Deci, E. L.** (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, 26(4), 331–362. DOI: <https://doi.org/10.1002/job.322>
- Gagné, M., Forest, J., Vansteenkiste, M., Crevier-Braud, L., Broeck, A. V. D., Aspel, A. K. & Westbye, C., et al.** (2015). The multidimensional work motivation scale: Validation evidence in seven languages and nine countries. *European Journal of Work and Organizational Psychology*, 24(2), 178–196. DOI: <https://doi.org/10.1080/1359432X.2013.877892>
- Gillet, N., Gagné, M., Sauvagère, S. & Fouquereau, E.** (2013). The role of supervisor autonomy support, organizational support, and autonomous and controlled motivation in predicting employees' satisfaction and turnover intentions. *European Journal of Work and Organizational Psychology*, 22(4), 450–460. DOI: <https://doi.org/10.1080/1359432X.2012.665228>
- Hardré, P. L. & Reeve, J.** (2009). Training corporate managers to adopt a more autonomy-supportive motivating style toward employees: An intervention study. *International Journal of Training and Development*, 13(3), 165–184. DOI: <https://doi.org/10.1111/j.1468-2419.2009.00325.x>
- Hinkin, T. R.** (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational Research Methods*, 1(1), 104–121. DOI: <https://doi.org/10.1177/109442819800100106>
- Hofer, J. & Busch, H.** (2011). Satisfying one's needs for competence and relatedness consequent domain-specific well-being depends on strength of implicit motives. *Personality and Social Psychology Bulletin*, 37(9), 1147–1158. DOI: <https://doi.org/10.1177/0146167211408329>
- Kessler, R. C., Barber, C., Beck, A., Berglund, P., Cleary, P. D., McKenas, D. & Wang, P., et al.** (2003). The World Health Organization health and work performance questionnaire (HPQ). *Journal of Occupational and Environmental Medicine*, 45(2), 156–174. DOI: <https://doi.org/10.1097/01.jom.0000052967.43131.51>
- Kristensen, T. S., Borritz, M., Villadsen, E. & Christensen, K. B.** (2005). The Copenhagen burnout inventory: A new tool for the assessment of burnout. *Work and Stress*, 19(3), 192–207. DOI: <https://doi.org/10.1080/02678370500297720>
- Lindwall, M., Barkoukis, V., Grano, C., Lucidi, F., Raudsepp, L., Liukkonen, J. & Thøgersen-Ntoumani, C.** (2012). Method effects: The problem with negatively versus positively keyed items. *Journal of Personality Assessment*, 94(2), 196–204. DOI: <https://doi.org/10.1080/00223891.2011.645936>
- Little, T. D.** (2013). *Longitudinal structural equation modeling*. New York, NY: Guilford Press.
- Longo, Y., Gunz, A., Curtis, G. J. & Farsides, T.** (2014). Measuring need satisfaction and frustration in educational and work contexts: The Need Satisfaction and Frustration Scale (NSFS). *Journal of Happiness Studies*, 16(1), 295–317. DOI: <https://doi.org/10.1007/s10902-014-9595-3>
- Lynch, M. F. Jr., Plant, R. W. & Ryan, R. M.** (2005). Psychological needs and threat to safety: Implications for staff and patients in a psychiatric hospital for youth. *Professional Psychology: Research and Practice*, 36(4), 415. DOI: <https://doi.org/10.1037/0735-7028.36.4.415>
- Mageau, G. A., Ranger, F., Joussemet, M., Koestner, R., Moreau, E. & Forest, J.** (2011). *Construction and validation of the perceived parental autonomy support scale (P-PASS)*. Manuscript submitted for publication.
- Marsh, H. W., Hau, K.-T. & Grayson, D.** (2005). Goodness of fit evaluation in structural equation modeling. In: Maydeu-Olivares, A. & McArdle, J. (Eds.), *Contemporary psychometrics. A festschrift for roderick P. McDonald*, 275–340. Mahwah, NJ: Erlbaum.

- McDonald, R. P.** (1999). *Test theory: A unified treatment*. Mahwah, NJ: Erlbaum.
- Moreau, E. & Mageau, G. A.** (2012). The importance of perceived autonomy support for the psychological health and work satisfaction of health professionals: Not only supervisors count, colleagues too! *Motivation and Emotion, 36*(3), 268–286. DOI: <https://doi.org/10.1007/s11031-011-9250-9>
- Muthén, B. & Kaplan, D.** (1985). A comparison of some methodologies for the factor analysis of non-normal Likert variables. *British Journal of Mathematical and Statistical Psychology, 38*(2), 171–189. DOI: <https://doi.org/10.1111/j.2044-8317.1985.tb00832.x>
- Muthén, L. K. & Muthén, B. O.** (1998–2012). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.
- Niemiec, C. P., Lynch, M. F., Vansteenkiste, M., Bernstein, J., Deci, E. L. & Ryan, R. M.** (2006). The antecedents and consequences of autonomous self-regulation for college: A self-determination theory perspective on socialization. *Journal of Adolescence, 29*, 761–775. DOI: <https://doi.org/10.1016/j.adolescence.2005.11.009>
- Niemiec, C. P., Ryan, R. M. & Deci, E. L.** (2009). The path taken: Consequences of attaining intrinsic and extrinsic aspirations in post-college life. *Journal of Research in Personality, 43*(3), 291–306. DOI: <https://doi.org/10.1016/j.JRP.2008.09.001>
- Otis, N. & Pelletier, L. G.** (2005). A motivational model of daily hassles, physical symptoms, and future work intentions among police officers. *Journal of Applied Social Psychology, 35*(10), 2193–2214. DOI: <https://doi.org/10.1111/j.1559-1816.2005.tb02215.x>
- Pejtersen, J. H., Kristensen, T. S., Borg, V. & Bjorner, J. B.** (2010). The second version of the Copenhagen Psychosocial Questionnaire. *Scandinavian Journal of Public Health, 38*(3 suppl), 8–24. DOI: <https://doi.org/10.1177/1403494809349858>
- Peterson, R. A.** (2001). On the use of college students in social science research: Insights from a second-order meta-analysis. *Journal of Consumer Research, 28*(3), 450–461. DOI: <https://doi.org/10.1086/323732>
- Podsakoff, P. M., Mackenzie, S. M., Lee, J. & Podsakoff, N. P.** (2003). Common method variance in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*, 879–903. DOI: <https://doi.org/10.1037/0021-9010.88.5.879>
- Richer, S. F., Blanchard, C. & Vallerand, R. J.** (2002). A motivational model of work turnover. *Journal of Applied Social Psychology, 32*(10), 2089–2113. DOI: <https://doi.org/10.1111/j.1559-1816.2002.tb02065.x>
- Ryan, R. M.** (1991). The nature of the self in autonomy and relatedness. In: Strauss, J. & Goethals, G. R. (Eds.), *Multidisciplinary perspectives on the self*, 208–238. New York: Springer-Verlag. DOI: [https://doi.org/10.1007/978-1-4684-8264-5\\_11](https://doi.org/10.1007/978-1-4684-8264-5_11)
- Ryan, R. & Deci, E.** (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York, NY: Guilford Press.
- Satorra, A. & Bentler, P. M.** (2010). Ensuring positiveness of the scaled difference chi-square test statistic. *Psychometrika, 75*(2), 243–248. DOI: <https://doi.org/10.1007/s11336-009-9135-y>
- Schaufeli, W. B., Bakker, A. B. & Salanova, M.** (2006). The measurement of work engagement with a short questionnaire a cross-national study. *Educational and Psychological Measurement, 66*(4), 701–716. DOI: <https://doi.org/10.1177/0013164405282471>
- Sjöberg, A. & Sverke, M.** (2000). The interactive effect of job involvement and organizational commitment on job turnover revisited: A note on the mediating role of turnover intention. *Scandinavian Journal of Psychology, 41*(3), 247–252. DOI: <https://doi.org/10.1111/1467-9450.00194>
- Steiger, J. H.** (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin, 87*, 245–251. DOI: <https://doi.org/10.1037/0033-2909.87.2.245>
- Vallerand, R. J.** (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In: Zanna, M. P. (Ed.), *Advances in experimental social psychology*, 271–360. San Diego, CA: Academic Press. DOI: [https://doi.org/10.1016/S0065-2601\(08\)60019-2](https://doi.org/10.1016/S0065-2601(08)60019-2)
- Van den Broeck, A., Ferris, D. L., Chang, C. H. & Rosen, C. C.** (2016). A review of self-determination theory's basic psychological needs at work. *Journal of Management, 42*(5), 1195–1229. DOI: <https://doi.org/10.1177/0149206316632058>
- Van den Broeck, A., Vansteenkiste, M. & De Witte, H.** (2008). Self-determination theory: A theoretical and empirical overview in occupational health psychology. In: Houdmont, J. & Leka, S. (Eds.), *Occupational health psychology: European perspectives on research, education, and practice*, 63–88. Nottingham: Nottingham University Press.
- Van den Broeck, A., Vansteenkiste, M., De Witte, H. & Lens, W.** (2008). Explaining the relationships between job characteristics, burnout, and engagement: The role of basic psychological need satisfaction. *Work and Stress, 22*(3), 277–294. DOI: <https://doi.org/10.1080/02678370802393672>
- Van den Broeck, A., Vansteenkiste, M., De Witte, H., Soenens, B. & Lens, W.** (2010). Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the Work-Related Basic Need Satisfaction Scale. *Journal of Occupational and Organizational Psychology, 83*(4), 981–1002. DOI: <https://doi.org/10.1348/096317909X481382>
- Van Knippenberg, D. & Sitkin, S. B.** (2013). A critical assessment of charismatic–Transformational leadership research: Back to the drawing board? *The Academy of Management Annals, 7*(1), 1–60. DOI: <https://doi.org/10.1080/19416520.2013.759433>
- Vansteenkiste, M. & Ryan, R. M.** (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration, 23*(3), 263. DOI: <https://doi.org/10.1037/a0032359>
- West, S. G., Taylor, A. B. & Wu, W.** (2012). Model fit and model selection in structural equation modelling. In: Hoyle, R. H. (Ed.), *Handbook of structural equation modeling*, 209–231. New York, NY: Guilford Press.

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