



A bifactor exploratory structural equation modeling representation of the structure of the basic psychological needs at work scale

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ARTICLE INFO

Article history:

Received 24 September 2016

Received in revised form 5 December 2016

Accepted 7 December 2016

Available online 8 December 2016

Keywords:

Need satisfaction

Dimensionality

ESEM

Bifactor

Work

ABSTRACT

This study investigates the structure of employees' ratings of the satisfaction of their basic psychological needs for autonomy, competence, and relatedness at work using the newly developed bifactor exploratory structural equation modeling (ESEM) framework. Using a sample of 366 exercise professionals who completed the new Portuguese version of the Basic Psychological Needs at Work Scale (BPNWS; Brien et al., 2012), the results demonstrated the superiority of a Bifactor-ESEM representation of BPNWS ratings when compared to alternative representations of the data (first-order and bifactor confirmatory factor analyses, and first-order ESEM). The results also supported the composite reliability, measurement invariance across gender, and nomological validity (in relations to measures of psychological wellbeing and distress at work) of BPNWS ratings. Importantly, these results demonstrated the importance of relying on measurement models providing a way to achieve a proper disaggregation of employees' global levels of need satisfaction relative to the satisfaction of their more specific needs for autonomy, competence, and relatedness.

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Using a sample of 35,765 workers from 35 European countries, the European Foundation for the Improvement of Living and Working Conditions (EUROFOUND, 2015) observed that 20% of European workers reported poor psychological wellbeing at work. Psychosocial risk factors at work are multiple and varied, including job strain, low decision latitude, low social support, high psychological demands, effort–reward imbalance, and high job insecurity (Stansfeld & Candy, 2006). In this regard, several studies conducted under the Self-Determination Theory (SDT) framework (Deci & Ryan, 2000, 2008) have demonstrated the critical role of the satisfaction of basic psychological needs at work in the relation between these risks factors and employees' psychological wellbeing and distress (Boudrias et al., 2014; Brien et al., 2012; Deci et al., 2001; Desrumaux et al., 2015). Given the important role of the satisfaction of basic psychological needs at work, the current study aims to provide an improved representation of the structure of the Basic Psychological Needs at Work Scale (BPNWS) while relying on a bifactor exploratory structural equation modeling analytical framework. As a further test of the validity and generalizability of this improved representation of

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the BPNWS structure, we also verify the extent to which it generalizes across gender through tests of measurement invariance, and assess the nomological validity of the BPNWS factors in relation to measures of psychological wellbeing and distress.

1. Basic psychological needs at work

SDT defines basic psychological needs as the “nutrients that must be procured by a living entity to maintain its growth, integrity and health” (Deci & Ryan, 2000, p. 326). SDT focuses more specifically on the needs for autonomy, competence and relatedness, which are believed to generalize across cultures and life domains (Deci & Ryan, 2000). It is important to keep in mind that, although the current study focuses on SDT as applied to the work domain (Gagné & Deci, 2005), SDT can be considered as a pan-human theory of motivation with well-established applications across life domains including sport (e.g., Gillet, Vallerand, & Paty, 2013), education (e.g., Ryan & Deci, 2009), health (e.g., Ng et al., 2012), and multiple domains perspectives (e.g., Standage, Gillison, Ntoumanis, & Treasure, 2012). According to SDT, the *need for autonomy* is defined as the need to experience choice and volition in one’s actions, rather than feeling controlled by external forces. When their needs for autonomy at work are fulfilled, workers experience a sense of personal control over their own work-related behaviors. The *need for competence* is defined as the need to experience effective interactions with one’s environment. When their needs for competence are fulfilled, workers feel that they have the ability to achieve desired work-related outcomes, and experience a sense of mastery and accomplishment at work. The *need for relatedness* is defined as the need to feel closeness, connection, and belongingness with others in one’s environment. When their needs for relatedness are fulfilled, workers’ feel included and accepted by significant others in their workplaces. Importantly, research has shown that employees’ need satisfaction tends to be positively associated with wellbeing outcomes, such as optimism, vigor, self-esteem, positive affect, or life satisfaction, and negatively associated with psychological distress outcomes, such as emotional exhaustion, distress, negative affect, depression, or anxiety (Brien et al., 2012; Deci et al., 2001; Desrumaux et al., 2015; Longo, Gunz, Curtis, & Farsides, 2016; Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008; Van den Broeck, Ferris, Chang, & Rosen, 2016; Vansteenkiste et al., 2007).

2. Measurement of the psychological needs at work

Over the past decades, several measures have been proposed to evaluate the satisfaction of basic psychological needs in work-related contexts, including the Basic Need Satisfaction at Work Scale (BNSW-S; Deci et al., 2001) and the Work-Related Need Satisfaction Scale (W-BNS) (Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010). Despite the widespread use of these measures, psychometric evidence regarding the generalizability of their psychometric properties to additional samples of employees beyond those used in the initial development studies remains lacking. Similarly, questions have been raised regarding the content of some of the items included in these instruments (e.g., Brien et al., 2012; Van den Broeck et al., 2010). Finally, the inclusion of negatively-worded items also raises concerns in terms of psychometric complexity (Marsh, Scalas, & Nagengast, 2010) and cross-cultural generalizability (Schmitt & Allik, 2005; Watkins & Cheung, 1995).

For these reasons, the present study focuses on yet another measure, the BPNWS (Brien et al., 2012). The BPNWS was developed to address some of the aforementioned limitations, and focuses on the assessment of the satisfaction of employees’ basic needs for autonomy, competence, and relatedness at work.¹ Using three samples of employees from Canada and France (total N = 1122), Brien et al. (2012) results supported the a priori 3-factor structure of ratings on this instrument, as well as their scale score reliability ($\alpha = 0.84$ to 0.90) and nomological validity in terms of relations between the BPNWS dimensions and measures of intrinsic motivation, wellbeing, distress, optimism, and procedural justice. They also demonstrated the cross-cultural generalizability of their factor structure to two samples of Canadian participants (Study 1 and Study 2), and one sample of French participants (supporting the measurement invariance of the model in Study 2). Given our objective of presenting a Portuguese adaptation of a measure of needs satisfaction, this pre-existing evidence of the cross-cultural generalizability of the psychometric properties of the BPNWS made this instrument particularly well-suited to the present study.

3. The bifactor exploratory structural equation modeling (Bifactor-ESEM) framework

One critical limitation of most prior research focusing on the structure of measures of employees’ need satisfaction is their reliance on the implicit assumption that their various subscales would be perfectly unidimensional psychometrically – which is a key assumption of confirmatory factor analyses (CFA). As noted by Morin, Arens, and Marsh (2016, p. 117), CFA “fail to account for at least two sources of construct-relevant psychometric multidimensionality, and might thus produce biased parameter estimates as a result of this limitation” (for similar arguments, see Morin, Arens, Tran, & Caci, 2016; Morin, Boudrias, Marsh, Madore, & Desrumaux, 2016; Morin, Boudrias, Marsh, McInerney et al., 2016).

The first of these two sources of construct-relevant psychometric multidimensionality is related to the assessment of hierarchically-ordered constructs, so that each item can be assumed to simultaneously contribute to the assessment of one specific

¹ It is important to acknowledge that Longo et al. (2016) recently proposed the Need Satisfaction and Frustration Scale (NSFS) to achieve a more comprehensive assessment of needs satisfaction and frustration. In the work context, the authors found support for an a priori six-factor model differentiating the satisfaction and frustration of employees’ needs for autonomy, competence, and relatedness. Unfortunately, this instrument was published after the current data collection was conducted, and thus could not be used in the present study. Furthermore, our goal was to focus on need satisfaction, and so far evidence regarding the distinctive nature of the need satisfaction and frustration constructs is limited to this single recent study (Longo et al., 2016).

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