



Investigating and explaining organizational antecedents of PSM

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Abstract

Purpose – First, the purpose of this paper is to contribute to the public service motivation (PSM) literature by increasing the limited knowledge of organizational antecedents of PSM. Second, by combining PSM with insights from self-determination theory (SDT), the paper aims to elucidate the link through which high-performance work systems (HPWS) relate to PSM.

Design/methodology/approach – Using a survey, the authors investigated nurses' perceptions of HPWS, PSM, and the satisfaction of basic psychological needs in four different German hospitals.

Findings – The results of this study provide empirical evidence that PSM is influenced by several HR practices and the three basic psychological needs autonomy, relatedness, and competence, which in turn are influenced by certain HR practices as well. Basic psychological needs do not fully mediate the relationship between HPWS and PSM.

Research limitations/implications – Four dimensions of HPWS are measured by a single item and the results are based on a German sample. They therefore might not apply to other countries. Future research will benefit from using a more corroborated measurement instrument of HPWS in different countries.

Practical implications – This study offers useful insights for HR managers in the nursing sector on the question how PSM can be fostered effectively.

Originality/value – This study adds to the limited knowledge of organizational antecedents of PSM by including ideas from HRM into the study of PSM. Second, by combining PSM with insights from psychology (SDT), this study sheds light on the mediating mechanisms which help to explain how HPWS relate to PSM; a conceptual model explaining the HPWS-PSM relationship is developed and tested.

Keywords Employee motivation, HRM in the public sector, Public service motivation (PSM), Organizational antecedents, High-performance work systems (HPWS), Self-determination theory (SDT)

Paper type Research paper



1. Introduction

One type of work motivation which has gained a considerable amount of attention over the last two decades is public service motivation (PSM) or the motives and actions, grounded in public institutions, which are intended to benefit others and shape their well-being (Perry and Hondeghem, 2008). Originating from the field of public

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administration, the concept has been adopted by other disciplines such as economics, psychology, and sociology (Ritz *et al.*, 2013). Because PSM seems to be a promising concept to identify predictable links between what drives employees and organizational outcomes, both academics and practitioners are interested in the concept (Brewer, 2008; Vandenabeele, 2009).

A large amount of quantitative research exists investigating the effect of PSM on performance-related outcome variables such as job satisfaction, organizational commitment, and interpersonal citizenship behavior (e.g. Bright, 2008; Leisink and Steijn, 2009; Pandey *et al.*, 2008). In contrast, only a minor strand of research focusses on the antecedents of PSM (e.g. Perry, 1997; Moynihan and Pandey, 2007; Camilleri, 2007). Perry and Hondeghem (2008) and Leisink (2004) agree that organizations should play a more active role in reinforcing and sustaining PSM. Only one study can be found investigating the effect of human resource (HR) management on PSM in a Swiss context among civil servants (Giauque *et al.*, 2013). More knowledge about how work needs to be organized in order to present a favorable basis for PSM is necessary, given that PSM is possibly related to performance (e.g. Leisink and Steijn 2009; Andersen and Serritzlew, 2012).

In this study, we address organizational antecedents as employee's perceptions of high-performance work systems (HPWS) and investigate their impact on PSM. HPWS can be seen as a bundle of interconnected but separate innovative HR practices which aim to enhance employee's skills and effort (Huselid, 1995; Wood and Wall, 2002). Examples of HPWS are job characteristics and organizational communication. A large amount of research exists and documents the impact of HPWS on organizational performance (e.g. Youndt *et al.*, 1996; MacDuffie 1995; Becker and Huselid, 1998; Combs *et al.*, 2006). More recent research started to investigate the influence of HPWS on individual-level variables and focusses on the mechanisms that underlie the HPWS-performance relationship (e.g. Takeuchi *et al.*, 2007; Wu and Chaturvedi, 2009). However, as far as we know, only one study exists which addresses the impact of HPWS on PSM (Giauque *et al.*, 2013).

Next to the limited knowledge focussing on organizational antecedents of PSM, no attention has been paid to the underlying mechanisms which explain how organizational antecedents influence PSM. Deci and Ryan's (2000) self-determination theory (SDT), a highly developed self-regulation framework, provides a plausible and detailed explanation for the phenomenon of PSM on an individual level of analysis. According to this theory, intrinsic motivation increases if three basic psychological needs (need for autonomy, competence, and relatedness) are satisfied.

This study has two main objectives. First, we aim to increase the limited knowledge of organizational antecedents of PSM. Using literature on HPWS, we try to explain how HR management can foster PSM. By doing so, we cannot only advise HR managers how to increase the level of PSM, but we also contribute to the general debate on the implications of HPWS in public sector organizations. Furthermore, by combining PSM with insights from SDT, we examine the intermediate links through which HPWS relate to PSM. This knowledge is theoretically relevant because it contributes to our understanding of the origins of PSM and its relationship with broader motivational psychological literature. By integrating these different disciplines of social science, we develop a conceptual model in order to explain the HPWS-PSM relationship. Next to this, we also contribute empirical values to the PSM literature by testing the proposed model.

This paper consists of five sections. We start with an introduction of PSM, HPWS, SDT, and the interrelation thereof, followed by the formulation of specific hypotheses. Second, we will conduct a brief introduction of the context of this study, which is the

German nursing sector, and describe data and methods. Third, we are presenting a description of our results. Fourth, the findings are being discussed and finally, conclusions are being drawn.

2. Theoretical framework

2.1 Introducing PSM

Perry and Wise (1990) provide the first definition of the concept PSM. The authors consider PSM as “a predisposition to respond to motives grounded primarily or uniquely in public organizations” (p. 368). Perry and Hondeghem (2008) considered PSM as an individual’s orientation to serve people with the intention to care for others within the community. Recently, it has been argued that PSM can be referred to as public service identity (Perry and Vandenabeele, 2008; Vandenabeele, 2007). Other scholars have argued that PSM can be seen as a specific form of intrinsic motivation (e.g. Crewson, 1997; Houston, 2000) or internalized extrinsic motivation (Jacobsen *et al.*, 2013; Vandenabeele, 2007). “These two types of motivation are comparable in the sense that there is no apparent reward related to the individual for either type of motivation” (Jacobsen *et al.*, 2013, p. 4). Ryan and Deci (2003) point out that they are alike in that they both represent fully autonomous motivation and that initial extrinsic motivation can turn into intrinsic motivation. This implies that the difference between well-integrated extrinsic and intrinsic motivation is very small and vague. We argue that PSM might be both, intrinsic and integrated extrinsic motivation. For this reason, we refer to PSM as autonomous motivation; a concept covering both types of aforementioned motivations.

We follow Vandenabeele (2008) who sees PSM as a five dimensional construct including the dimensions attraction to public policy making, commitment to public interest, compassion, self-sacrifice, and democratic governance[1]. Attraction to public policy making can be considered as the desire to work in the public sector based on the given opportunity of making public policy (Perry, 1996). Commitment to public interest is the desire, grounded in altruism, to serve the public interest (Perry, 1996). Compassion can be regarded as a sense of patriotism and benevolence which is described by Frederickson and Hart (1985) as an extensive love for all people within the community and the imperative to protect them. The willingness to render services to others for tangible personal rewards refers to self-sacrifice (Perry, 1996). Finally, democratic governance refers to a set of values, such as equality and accountability, which can be considered as typical for public services in democratic regimes (Vandenabeele, 2008).

PSM is frequently treated as an independent variable. The interest in the consequences of PSM is likely to be related to the general assumption in PSM literature which claims that PSM is positively related to individual performance (Perry and Wise, 1990). Most of the time, performance is measured by self-reported outcome variables such as job satisfaction (Bright 2008; Wright and Pandey, 2008), organizational commitment (Camilieri, 2007; Crewson, 1997; Leisink and Steijn, 2009), and turnover intentions (Bright 2008; Naff and Crum, 1999). Recently, awareness has increased that the PSM-performance relationship might be more complex than initially thought. It might be necessary to include contextual factors in the analysis. For example, some scholars have integrated the idea of person-organization fit into the analysis of the PSM-performance relationship (Bright, 2007; Wright and Pandey, 2008).

Another line of research focusses on the antecedents of PSM. Kjeldsen (2012) and Andersen and Pedersen (2012) found out that professionalism relates to differences in the level of PSM. The authors emphasize that differences in the degree of professionalism (ranging from low, such as health assistants, to high, such as physicians) have varying relationships with the separate dimensions of PSM. Perry (1997) explicitly calls for research in order to investigate the impact of organizations on PSM. Just recently, Perry's call has been repeated by Brewer (2008) who argues that insufficient attention has been paid to organizational antecedents of PSM. This line of thought is also supported by Leisink (2004). The author suggests that personnel policies may be of assistance in creating conditions at work that help to generate PSM. Nevertheless, the number of studies investigating organizational antecedents of PSM remains limited. Moynihan and Pandey (2007) were able to demonstrate that red tape is negatively related to PSM, whereas hierarchical authority, and reform orientation have a positive impact on PSM. Camilleri (2007) found evidence that suggests a positive relationship between employee-leader relations and PSM and job characteristics and PSM. Other scholars (e.g. Georgellis *et al.*, 2011; Giauque *et al.*, 2013; Jacobsen *et al.*, 2013) highlighted the negative consequences of monetary incentives on PSM. Crowding-out theory (Frey and Jegen, 2001) offers a plausible explanation for this phenomenon in situations in which recipients receive rewards as controlling. By relating payment to individual performance, individuals can no longer perform an activity purely for the sake of it which is a key element of intrinsic motivation. Therefore, monetary incentives might undermine PSM which is a specific form of intrinsic motivation. Very recently, first attempts have been made to assess the organizational antecedents of PSM by investigating the impact of several HR practices on PSM as a multidimensional concept (Giauque *et al.*, 2013) and on the civic duty component of PSM (Gould-Williams *et al.*, 2013). Giauque *et al.* (2013) point out explicitly that future research would benefit from using multiple items in order to better assess the public employees' perceptions of HR practices. In this study, we accept this invitation. We use an instrument that measures three HPWS using multiple items and, beyond that, we use a more comprehensive survey instrument of PSM; the 18-items instrument developed by Vandenabeele (2008).

2.2 Organizational antecedents: HPWS

In this study, organizational antecedents are examined by the concept of perceived HPWS[2]. HPWS can be regarded as a bundle of separate but interconnected HR practices that are designed to translate organizational goals into employees needs through eliciting employees' commitment and involvement with organization goals so that individual behavior is self-regulated rather than controlled by external contingencies (Walton, 1985; Wood and Albanese, 1995). They aim to stimulate employees to adopt behaviors that are congruent with the goals of the organization (MacDuffie, 1995). Plenty of literature exists documenting the effect of HPWS on organizational performance (Combs *et al.*, 2006). However, triggered by inconsistent findings regarding the HPWS-performance relationship (e.g. Wall and Wood, 2005; Wright *et al.*, 2005), more recent research started to focus on the underlying mechanisms explaining the HPWS-performance relationship. For example, Evans and Davis (2005) provide a theoretical framework of how the internal social structure of the organization possibly mediates the relationship between HPWS and performance. Takeuchi *et al.* (2007) integrated the resource-based view of the firm and the social exchange theory perspective into the study of the relationship between HPWS and performance. A related

line of research focusses on the impact of HPWS on individual-level outcomes. For example, based on empirical research, Gould-Williams (2003) concludes that HPWS practices are likely to lead to superior performance as they impact crucial competitive factors like job satisfaction, commitment, and trust. Kehoe and Wright (2010) found empirical evidence suggesting that perceived HPWS influence absenteeism, the employees' intent to remain with the employing organization, and organizational citizenship behavior.

Most of the research on HPWS has been done in the private sector, although tighter budgeting regimes and austerity measures increase the pressure on public sector organizations in order to deliver public services in an efficient and effective way. These developments provide a logical link to the possible need for HPWS practices in public organizations (Gould-Williams, 2003).

A scientific debate has been structured around the questions which HR practices can be considered as part of HPWS. No overall consensus has been reached regarding its constituting practices yet (Becker and Gerhart, 1996; Guest, 1997). Previous research (e.g. Beltrán-Martín *et al.*, 2008; Guthrie *et al.*, 2009; Harley *et al.*, 2007; Pfeffer, 1998; Snell and Dean, 1992) suggested that HPWS should involve the following seven HR practices: selection process, consultation, job characteristics, training, autonomous teamwork, organizational communication, and performance-based pay. In this study, we will rely on these seven HR practices. The dimension selection process refers to the rigorous use of selection methods such as tests, work samples, and interviews. Consultation refers to the extent of how much participation in decision-making individuals have in situations where changes affecting their work are introduced. Following Hackman and Oldham (1976), job characteristics indicate the degree to which the job can be considered to be meaningful and the degree to which a completion of an entire piece of work is required. Training assesses to determine whether employees have sufficient possibilities to develop their skills, capabilities and tacit knowledge that is necessary to master work-related challenges. Autonomous teamwork captures the extent to which members of a work team are responsible for the planning and execution of their work (Hackman and Oldham, 1976). The dimension organizational communication captures the degree to which employees are kept informed about changes in their organization (Myers and Myers, 1982). Finally performance-based pay addresses the degree to which rewards are related to individual performance.

2.3 Explaining the link between HPWS and PSM: SDT

After having introduced PSM and HPWS, the question remains how the PSM-HPWS relationship can be explained. What are the underlying mechanisms explaining the impact of the organizational concept HPWS on the individual concept PSM? This question is related to one point by Perry and Vandenabeele (2008) who – after arguing that the origin of PSM is in the public content of institutions – question how institutional logics are transmitted from an institutional level to the individual level (p. 60). The authors suggest several theories from social science which might explain this transmission mechanism. In the present study, we will focus on STD and empirically investigate whether integrating PSM, HPWS, and SDT indeed provides useful insights.

SDT developed by Ryan and Deci (2000) provides a plausible and detailed explanation for the phenomenon of PSM at an individual level of analysis. The theory, one of the most well-established theories on human motivation in psychological literature, proposes that the environment has a direct impact on individual motivation. Gagné and Deci (2005) distinguish between four forms of extrinsic motivations on

a controlled to autonomous continuum varying on their degree of external regulation (external regulation, introjected regulation, identified regulation, integrated regulation) and intrinsic motivation which is the most autonomous type of motivation. While intrinsic motivation is characterized by doing an activity completely volitionally and enjoying it, extrinsic motivation refers to doing something because the behavior leads to operationally separable consequences (Ryan and Deci, 2000). With the process of internalization – which depends on the satisfaction of three basic psychological needs (need for autonomy, competence, and relatedness) – the level of external regulation decreases and the motivation becomes more autonomous. More precisely, internalization can be defined as taking in values and attitudes so that, subsequently, external regulation of behavior is transferred into an internal regulation[3] and therefore does no longer require the presence of external contingency (Gagné and Deci, 2005). The need for autonomy can be defined as the desire of individuals to be the origin and source of their own behavior. Relatedness refers to the feeling of being connected with significant others, cared for, or to be part of a certain social group. Competence refers to one's tendency to interact effectively with the environment and to look for opportunities to exercise and express one's capabilities.

Based on insights from SDT, it can be argued that if HPWS contribute to the satisfaction of the need for autonomy, relatedness and competence, external regulation is internalized and motivation becomes more autonomous. Depending on how successful organizations are in satisfying their employee's basic needs, the level of PSM will be higher because this satisfaction can be considered to be the origin of autonomous motivation.

2.4 Hypotheses linking HPWS, basic psychological needs, and PSM

In this section, we will elaborate the interrelatedness of the three concepts HPWS, basic needs, and PSM, and develop specific hypotheses. Regarding the discussion of the impact of HPWS on basic needs, we will only discuss the strongest relationships that can be expected. This implies that weaker and non-relationships remain unmentioned.

According to Steijn (2008), PSM “pertains to the inherent psychological satisfaction of working, such as finding work interesting, and the challenge, intellectual stimulation, and the variety offered by the work” (p. 14). In other words, if work is organized in such a way that employees are in charge, that work is experienced as meaningful, and that employees are challenged by learning new tasks, then PSM is likely to be high. It can be considered that HR practices which stimulate these aspects of work can influence PSM positively. Based on the description of the different HR practices in the previous section, one can think of job characteristics, autonomous teamwork, and training in particular. Next to this, the dimension consultation and organizational communication are expected to have a positive impact on PSM, too. Individuals who are in charge of decision making and are informed about changes in the organization will be more PSM because these individuals more easily succeed in contributing to the public interest than employees which are other-directed. Employees who passed a rigorous selection process will also score high on PSM due to the fact that supervisors are likely to be biased in favor of PDM employees (Wright and Grant, 2010). Wright and Grant (2010) argue that supervisors possibly make inferences based on observations of employees' emotions, attitudes and behaviors leading to selectively recall desirable behaviors of employees with high PSM. Unlike the other dimensions of HPWS, performance-based pay will reduce PSM because – in accordance with crowding-out theory discussed earlier in this paper – monetary incentives have

a negative influence on intrinsic motivation (assuming that the reward is perceived as controlling by the recipient). This leads to the first hypothesis of this study:

H1a. The HR practices selection process, training, consultation, organizational communication, autonomous teamwork, and job characteristics have a positive impact on PSM.

H1b. The HR practice performance-based pay has a negative impact on PSM.

If employees pass a rigorous selection process, the probability increases that an optimal match between the candidate's competences and those required for performing the job are realized. Because of this match, the employee's need for competence is expected to be satisfied. Since a rigorous selection process also helps to ensure that the employee will fit into an organization from a social point of view, the process is also likely to influence the satisfaction for the need for relatedness. The dimension training presents a set of activities which react to the employee's needs regarding skills, competencies, know-how, and tacit knowledge. Because of the effects of training, employees are more likely to feel that they can handle challenging situations successfully. In other words, training is expected to influence the satisfaction of the need for competence. Regarding consultation, it is expected that this dimension is related to the satisfaction of the basic needs competence and autonomy. Putting employees in charge of decision making in situations of work-related changes is likely to stimulate the feeling that their competences and experience are necessary to accomplish certain goals. In addition, if consultation takes place, employees gain more control over work processes and policies. This makes it easier for them to satisfy the desire to be the source of their own behavior. According to Visser (2000), organizational communication strengthens employees' organizational identification by giving workers the feeling that they have been included in the development of shared meanings through interaction and participation. Consequentially, a positive relationship between organizational communication and relatedness is expected. Autonomous teamwork is characterized by a high level of shared responsibility and flat structures (Beardwell and Claydon, 2007) implying that this HR practice is likely to have a positive effect of the need for autonomy. Next to this, because autonomous teamwork requires members of a team to engage in close collaboration, the feeling of relatedness with other team members is expected to be strengthened. A high score on the dimension job characteristics implies that employees are involved in completing an entire piece of meaningful work (Hackman and Oldham, 1976). By doing a job from the beginning to the end, employees get informative feedback from their job which is expected to lead to a higher level of competence (assuming that the feedback is constructive and related to abilities). Furthermore, previous research highlighted that rich jobs are associated with the feeling of autonomy (Gagné *et al.*, 1997). In contrast to the other HR practices, performance-based pay is expected to have a negative effect on the satisfaction of basic needs. Previous research emphasized that employees perceive incentive programs as something externally imposed, which made them feel that their autonomy was challenged (McDonald and Roland, 2009). This leads to the second hypothesis of this study:

H2a. Selection process is positively related to competences and relatedness.

H2b. Training is positively related to competence and autonomy.

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- H2c.* Consultation is positively related to competence and autonomy.
- H2d.* Organizational communication is positively related to relatedness.
- H2e.* Autonomous teamwork is positively related to relatedness and autonomy.
- H2f.* Job characteristics are positively related to competence and autonomy.
- H2g.* Performance-based pay is negatively related to autonomy.
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Fundamental to SDT is the idea that “satisfied basic psychological needs provide the nutriment for intrinsic motivation and internalization” (Gagné and Deci, 2005, p. 336). Assuming that PSM is a specific form of autonomous motivation, we argue that the satisfaction of one or more basic psychological needs increases the level of PSM. This leads to the following hypothesis:

- H3.* The satisfaction of basic psychological needs is positively related to PSM.

As theorized above, different dimensions of HPWS are related to the satisfaction of different basic psychological needs of employees (*H2*) and satisfied psychological basic needs are the foundation of PSM (*H3*). This implies that the satisfaction of basic needs plays an important role in explaining the HPWS-PSM relationship. The influence of HPWS on PSM can be explained by the fact that HPWS influence the satisfaction of basic needs, which in turn influence PSM. This brings us to our final hypothesis:

- H4a.* Autonomy mediates the relationship between training and PSM, consultation and PSM, job characteristics and PSM, autonomous teamwork and PSM, and performance-based pay and PSM.
- H4b.* Competence mediates the relationship between selection process and PSM, training and PSM, consultation and PSM, and job characteristics and PSM.
- H4c.* Relatedness mediates the relationship between selection process and PSM, organizational communication and PSM, and autonomous teamwork and PSM.

All hypotheses developed in this study are summarized in Figure 1. It presents the overall theoretical framework of this study.

3. Methods

3.1 Sample and procedure

There are approximately 305,000 registered nurses in Germany. Most of them are employed at hospitals; others work at homes for elderly or rehabilitation centres. Germany knows three different types of hospitals; private, public, and non-profit hospitals. The education of registered nurses is regulated at European level. Following Andersen and Pedersen (2012), nurses' level of professionalism can be considered to be medium. The data of this study was gathered in the summer of 2010 using standardized paper-and-pencil questionnaires. The questionnaires were distributed to more than 850 nurses working at four different German hospitals (two public, two private) during their daily shift handover by the head nurse. After filling in the questionnaire, the nurses were asked to return the questionnaire by (pre-paid) post. The response rate varied

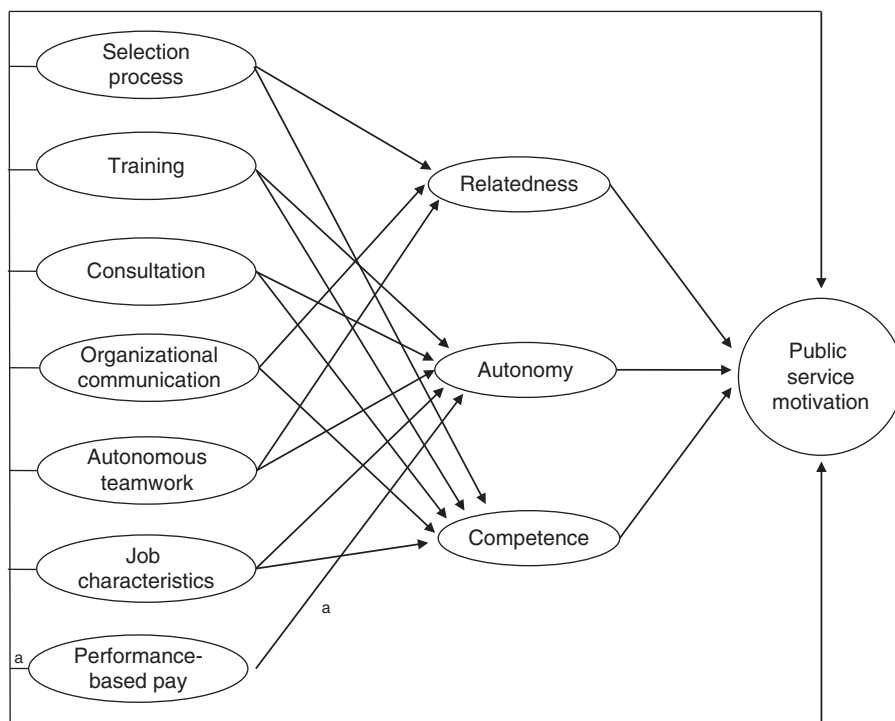


Figure 1.
Conceptual model

Note: ^a Negative relationship (performance-based pay – PSM and performance-based pay – autonomy)

from 22 to 52 percent depending on the hospital. This yielded a total response of 251 respondents (39 percent).

Following the common practice (Pandey and Stazyk, 2008, p. 102), four socio-demographic characteristics are included as control variables, position, age, gender, and educational level. Most respondents worked as “regular nurses” (65 percent) without any specialization or supervisory responsibilities. Table I summarizes all socio-demographic characteristics of the respondents.

To avoid problems related to survey translations across different languages, we took several measures recommended by Brislin (1990). First, the first author, a native German speaker, translated the English items into German. Second, a bilingual faculty member improved the translation. Third, a nurse, not affiliated to the study, read through the survey focussing on its readability and comprehensiveness. In the end, a second native German speaker translated the items back to English and the German and the English version of survey were compared. Regarding the instruments of PSM and basic psychological needs, no discrepancies were found. HPWS are measured by a strongly modified version of an existing instrument. Therefore, we did not apply the aforementioned measures to the HPWS instrument.

3.2 Reliability and construct validity of the measurement instruments

The instruments used in this study rely on self-reports. Self-reports are commonly used to measure the individual variables PSM and basic psychological needs. In contrast,

	<i>n</i>	%	Organizational antecedents of PSM
<i>Position</i>			
Apprentice	6	2.5	
Nurse	157	65.4	
Specialized nurse	51	21.3	
Nurse in supervisory position	37	10.8	
<i>Age</i>			
< 35	53	21.1	
≥ 35 and < 55	184	73.3	
≥ 55	14	5.6	
<i>Educational level</i>			
Nursing school	199	87.3	
University of applied science	27	11.8	
University	2	0.09	
<i>Gender</i>			
Male	57	22.7	
Female	194	77.3	
<i>Type of hospital</i>			
Private	37	13.5	
Public	217	86.5	

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Table I.
Socio-demographic statistics

the appropriate level of measurement for HPWS has been the topic of many discussions (e.g. Becker and Huselid 1998; Gerhart *et al.*, 2000). Early research has focussed on plant and unit level (e.g. MacDuffie, 1995; Youndt *et al.*, 1996) using (HR) managers as key informants to evaluate the presence of HPWS. However, as pointed out by other scholars (e.g. Gerhart *et al.*, 2000; Ramsay *et al.*, 2000), if HPWS are addressed at an organization level, it is not possible to know whether all employees experience the implemented HR practices in the same way. Because we are interested in the HR practices experienced by the nursing staff in practice and not in the HR policies that are written down formally which might be different, we argue that it is appropriate to address HPWS as perceived HPWS of employees in the this study. This is in line with a growing number of other studies on HPWS (e.g. Chang, 2005; Kuvaas, 2008; Robert *et al.*, 2000; Takeuchi *et al.*, 2007).

In Table II, all constructs, including their dimensions, are summarized. Next to this, the measurement's Cronbach's α , standard deviations (SD), and means are provided. In the Appendix, a complete list of all items can be found (Table IA).

PSM is measured by a modified version of Perry's (1996) measurement scale which is shorter (18 items) and more suitable for a non-US environment (Vandenabeele, 2008). Cronbach's α was tolerable acceptable for both, the overreaching concept PSM and its separate dimensions indicating that the measurement is reliable. Only the dimension "democratic governance" scored low ($\alpha = 0.50$). Since Cronbach's α reliability coefficients depend on the number of items which measure a concept (Dooley, 2001) and "democratic governance" is addressed by only three items, we kept the dimension regardless the low α .

To measure basic psychological needs, a measurement instrument, adopted from Vlachopoulos and Michailidou (2006), is used to assess the degree to which the innate needs for autonomy, competence, and relatedness are satisfied among the nursing staff. As the scale was initially developed to measure the extent to which basic needs are satisfied in exercise, minor changes had to be made.

Table II.
Summary of
measurement
instruments

Construct	Author	Dimensions	No. of items	Crobach's α	M	SD
PSM	Vandenabeele (2008)	Commitment to public interest	4	0.65	3.94	0.90
		Compassion	5	0.75	3.62	0.74
		Attraction to public policy making	2	0.69	3.04	0.88
		Self-sacrifice	4	0.68	3.99	0.93
		Democratic governance	3	0.50	3.18	0.70
Basic needs	Modified version of Vlachopoulos and Michailidou (2006)	Autonomy	3	0.63	3.29	0.63
		Competence	4	0.75	3.59	0.60
		Relatedness	3	0.84	3.96	0.83
Perceived HPWS	Modified version of Harley <i>et al.</i> (2007)	Selection process	1		3.34	
		Training	1		3.07	
		Performance-based pay	2	0.63	3.12	0.69
		Consultation	1		2.47	
		Organizational communication	1		3.49	
		Autonomous teamwork	5	0.74	3.78	1.04
		Job characteristics	2	0.85	4.06	0.85

Originally, each of the three dimensions was measured by four items. The pilot test, however, identified two items (item BPN_A3 item and BPN_R3) to be confusing. These items were excluded from the follow-up survey. The remaining items yield tolerable reliability (varying from $\alpha = 0.63$ up to $\alpha = 0.84$) for all three dimensions.

Perceived HPWS (14 items) are assessed by a strongly modified versions of Harley's *et al.* (2007) measurement instrument which is based on Snell and Dean (1992), Idaszak and Drasgow (1987), the WERS 89[4], and the 1995/1996 Euro-barometer survey. There are two reasons for the modifications: the first is to fit the nursing context and the second is to ensure that all questions are asked in the same manner (five-point Likert scales ranging from agree to disagree). This provides obviously a threat to construct validity of the HPWS measurement. This is a limitation of the present study which is discussed in the limitation part. The number of items being used to measure the seven dimensions of HPWS varies from one to five items.

In order to assess if the applied instruments measuring PSM and basic psychological needs have a good fit with their underlying theoretical models, two first order confirmatory factor analyses are performed using LISREL. The construct validity of HPWS was not estimated because four dimensions of HPWS were measured by one item and not Harley's *et al.* (2007) original instrument, but a strongly modified version has been used. For factor analysis models involving ordinal variables (like in this study) diagonally weighted least square estimation is a particularly appropriate method because it is distribution free (Vandenabeele, 2008). Because the frequently cited fit index χ^2 has been criticized in structural equation modeling literature (e.g. Brown, 2006; Kelloway, 1998), χ^2 will not be used to evaluate the measurement model. Following the recommendation of William *et al.* (2009), the comparative fit index (CFI) and the root mean square error approximation (RMSEA) are applied instead, because "they are better in assessing model fit" (p. 585). Using more than one index to examine the overall model fit is favorable, since it is possible for a model to be adequate on one fit index while being inadequate on others at the same time (Bollen, 1998). A CFI indicator above 0.95

and a RMSEA value beyond 0.08 can be interpreted as demonstrating good model fit (Williams *et al.*, 2009). This was the case for the theoretical model of PSM (see Table III). However, the fit indicator CFI of the instrument for basic psychological needs was below the expected threshold of 0.95. For this reason, item BPN_C4, which rendered non-significant factor loading, was excluded from further analysis. As a result, both fit-indices increased passing the required cutoff point (see Table III) and implying that the instruments measuring PSM and basic psychological needs have high-construct validity.

Using self-reports to measure the dependent and independent variable increases the risk of common method bias (CMB). To examine the likelihood of CMB we performed a Harman's single factor test (1967). Even though there are some disadvantages of this procedure, the test can be considered to be the most widely used technique to address the threat of CMB (Podsakoff *et al.*, 2003). The simultaneously loading of all items into one factor revealed much weaker fit indices than the three factor basic needs model and the five factor PSM model, indicating that the threat of CMB can be considered to be small (see Table III).

3.3 Statistical analysis

To test the hypotheses underlying the theoretical model, ordinary least squares regression analysis is performed. The mediating effect of three basic psychological needs is addressed by applying a hierarchical regression analysis to the four rules of Baron and Kenny (1986). These rules state that mediation is shown when: first, there are significant correlations between the independent variable and the presumed mediator (path a); second, the presumed mediator affects the dependent variable (path b); third, differences in the independent variable are significantly related to differences in the dependent variable (path c); and finally, when path a and path b are controlled, the previously significant relationship between independent and dependent variable (path c) vanishes (for a schematic overview, see Figure 2).

	CFI	RMSEA
PSM (5-factor model)*	0.950	0.067
PSM (1-factor model)	0.875	0.091
Basic needs (3-factor model)	0.948	0.071
Basic needs without item BPN_C4 (3-factor model)*	0.971	0.058
Basic needs without item BPN_C4 (1-factor model)	0.557	0.213
Cutoff criteria	>0.95	<0.08

Note: *Models used in the analysis of this study

Table III.
Fit statistics
calibration models

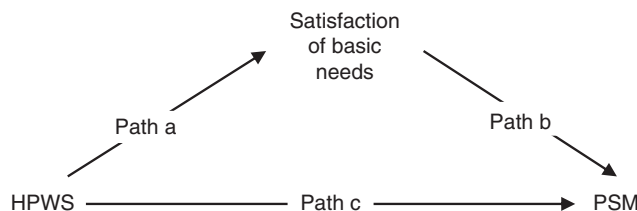


Figure 2.
Schematic representation
of the rules of
Baron and Kenny

However, following Vandenabeele (2009), complete mediation is unlikely to be achieved because of the complexity of social reality. The author suggests that the final condition can be relaxed to a significant reduction instead of a complete elimination of the effect size. In this case, we can speak of partial mediation. Partial mediation is tested by the Sobel test which is a method developed by Sobel (1982). To test this partial mediation effect, the Sobel test divides the mediation effect (β of path a multiplied by β of path b) by its standard error resulting in a Z-score. A Z-score > 1.95 can be considered to be the cutoff score for partial mediation (Vandenabeele, 2009).

4. Results

In Table IV, means, SD and Pearson's correlation coefficients between all variables under this study are summarized. Strong correlations between PSM and all basic needs can be observed. Four out of the seven HR practices correlate with PSM and most of them also correlate with at least one of the basic needs, indicating that we cannot reject the hypothesis of mediation based on the investigation of correlations. Only the subscale selection process is independent. It neither correlates with PSM nor with one of the basic needs. Next to this, only weak correlations between the predictor variables are found, thus reducing the threat of multicollinearity.

Table V reports the results of the regression analysis. Because the control variables (age, gender, position, education, and type of hospital) have no effect, they are not included in the table. The analysis shows that 8 percent (adj. R^2 0.08) of the variation of PSM can be explained by variation in the independent variables (path c). In this relationship, the dimension job characteristics plays the most important role. *H1a* is supported for the three HR practices training, consultation, and job characteristics. Table V also shows that training has a positive effect on autonomy and relatedness. Consultation is associated with autonomy. Autonomous teamwork influences competence and relatedness and job characteristics have an effect on autonomy and on competence. This implies that *H2b*, *H2c*, *H2e*, and *H2f* (or path a) are partially supported. Finally, Table V provides adequate explanation for variation of PSM by variations in basic psychological needs (adj. R^2 0.17). The satisfaction of all three basic needs is positively related to PSM implying that *H3* (or path b) can be accepted.

As recommended by Baron and Kenny (1986) (after verifying path a, b, and c), a fourth regression analysis has to be performed integrating the mediator variable into the analysis of the relationship between the independent and the dependent variable in order to test for possible mediation effects. Obviously, only the HPWS dimensions which proved to have a significant influence on PSM and basic needs in the previous analyses were included in the final one. This means, in the context of this study, that the effect of job characteristics, consultation, and training on PSM is tested again, but this time the mediator – satisfaction of basic psychological needs – is held constant to test the model sequentially. The results of the mediation model are summarized in Table VI.

It can be observed that the initially significant dimension training is fully mediated by the psychological basic need relatedness. After including relatedness into the model, the relationship between training and PSM (path c) is no longer significant. Next to this, it can be observed that the initially strong effects of job characteristics and consultation on PSM have been reduced. As recommended by Vandenabeele (2009), this reduction in the β 's prompts to perform a Sobel test to test for partial mediation.

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
<i>Basic needs</i>													
1. Autonomy	3.29	0.63	1										
2. Competence ^a	2.96	0.48	0.246**	1									
3. Relatedness	3.96	0.83	0.035	0.109	1								
<i>Perceived HPWS</i>													
4. Job characteristics	4.06	0.85	0.167**	0.175**	0.171**	1							
5. Org. communication	3.49	0.58	0.058	0.019	0.167**	0.178**	1						
6. Performance -based pay	3.12	0.69	-0.031	-0.089	0.070	0.061	0.041	1					
7. Consultation	2.47		0.128*	0.059	0.118	0.020	0.227**	0.194**	1				
8. Selection process	3.34		-0.019	-0.008	-0.003	0.090	0.046	-0.059	-0.075	1			
9. Auto. teamwork	3.87	0.61	-0.025	0.143*	0.418**	0.222**	0.189**	0.101	0.118	0.012	1		
10. Training	3.07		-0.094	0.088	0.133**	0.098	0.078	-0.045	0.064	0.001	0.130*	1	
11. PSM	3.24	0.45	0.235**	0.250**	0.309**	0.213**	0.120	-0.001	0.170**	-0.035	0.152*	0.206**	1

Notes: ^aItem BPN_C4 is removed based on the results of the CFA. **, *Significant at <0.01 and <0.05 level, respectively (two-tailed)

Table IV.
Correlation matrix
of variables included
in this study

Table V.
Regression statistics
for all variables
included in this study

	Autonomy (path a) β SE (B)	Competence (path a) β SE (B)	Relatedness (path a) β SE (B)	PSM (path b) β SE (B)	PSM (path c)
Selection process					
Training	-0.020 (-0.006) 0.148** (0.237)	-0.022 (-0.006) 0.043 (0.65)	0.032 (0.057) 0.205*** (0.431)		-0.038 (-0.048) 0.081 0.144** (0.994) 0.450
Consultation	0.136** (220)	0.067 (0.102)	0.025 (0.054)		0.131* (0.914) 0.465
Org. communication	-0.020 (-0.039)	-0.053 (-0.096)	0.029 (0.075)		0.014 (0.116) 0.550
Auto. teamwork	-0.091 (-0.282)	0.119* (0.350)	0.370*** (1.505)		0.083 (1.086) 0.853
Job characteristic	0.201*** (0.446)	0.162** (0.342)	0.049 (0.143)		0.185*** (1.749) 0.615
Performance-based pay	-0.090 (-0.184)	-0.125 (-0.242)	0.008 (0.021)		-0.036 (-0.319) 0.562
Autonomy				0.189*** (0.804) 0.260 0.175** (0.786) 0.275	
Competence				0.283*** (0.920) 0.193	
Relatedness	F -model 3.363 R^2 0.089 Adj. R^2 0.063	F -model 2.281 R^2 0.062 Adj. R^2 0.035	F -model 9.953 R^2 0.226 Adj. R^2 0.203	F -model 17.11 R^2 0.179 Adj. R^2 0.168	F -model 3.985 R^2 0.108 Adj. R^2 0.081
Controls ^a : yes					

Notes: ^aControls in this study are position, age, educational level, gender, and type of hospital. *, **, ***Significant at <0.1, <0.05 and <0.01 level, respectively (two-tailed)

Notes: ^aControls in this study are position, age, educational level, gender, and type of hospital. **, ***: Significant at <0.1, <0.05 and <0.01 level, respectively (two-tailed)

Table VI.
Mediation model:
regression statistics
for HPWS and PSM
while the mediator
is fixed

According to the results of the Sobel test, the relationship between job characteristics and PSM is not partially mediated by competence ($Z = 0.58$) and autonomy ($Z = 0.65$). A mediation effect of autonomy concerning the relationship between training and PSM ($Z = 0.65$) and consultation and PSM could neither be verified ($Z = 0.63$). Therefore, we reject *H4*. The results of the Sobel test are summarized in Table AII in the Appendix.

Generally speaking, Table VI provides evidence that the development of the model is truly hierarchical. PSM is explained best in the final model (adj. R^2 0.19). This provides evidence for the unique contribution of adding HPWS and basic psychological needs to the analysis.

5. Discussion

5.1 Summary of findings

Even though the data does not completely support the conceptual model as presented in the theoretical framework, one can conclude that this study provides empirical evidence for the importance of the organizational context in fostering PSM directly and via the satisfaction of basic psychological needs. There are three major findings in this study showing that – and how – certain HPWS, the satisfaction of basic psychological needs, and PSM are related.

First, unlike hypothesized, not all HPWS seem to play an important role in the context of this study. job characteristics, consultation, training, and autonomous teamwork seem to be important antecedents of both, basic psychological needs and PSM. In contrast, selection process, performance-based pay, and organizational communication do not have a significant impact on the independent variable. This means, *H1* and *H2* are partially supported by the data. Second, as expected by *H3*, all three basic psychological needs are antecedents of PSM. Together they explain 17 percent of the variance of the dependent variable (adj. R^2 0.17). Third, even though a mediating effect of basic psychological needs cannot be calculated (*H4*) in general, the results support the unique contribution of certain HPWS and all basic psychological needs in explaining PSM (adj. R^2 0.19). Contrary to our expectations, the basic psychological need relatedness mediates the relationship between training and PSM.

5.2 Theoretical contributions

This study provides two important contributions to the existing literature on PSM. First, by including ideas from HRM into the study of PSM, this study increases the limited knowledge of organizational antecedents of PSM. Second, by combining PSM with insights from psychology (SDT), we offer valuable clues of the mechanisms that help to explain the HPWS-PSM relationship. This study contributes to the understanding which HR practices foster PSM and how this relationship looks like.

By showing that certain HPWS have a positive impact on PSM, namely job characteristics, consultation, and training, we joined leading scholars like Perry (1997) and Brewer (2008) who point out that more research is needed in order to investigate the (organizational) antecedents of PSM. Beyond that, as suggested by Giauque *et al.* (2013), we investigate the HPWS-PSM relationship using more elaborated measurement instruments of HPWS and PSM. Especially the finding that job characteristics seems to nourish PSM fits well to another line of research, highlighting that the level of PSM is associated with the pro-social impact of the job (Bellé, 2012; Grant *et al.*, 2007). Against expectations, our study offers no support for the hypothesis claiming that the HR practices selection process and organizational

communication also provide favorable ground for PSM. These findings contradict well-established literature, which treats HPWS as a best practice approach (e.g. Becker and Huselid, 1998; Huselid, 1995). Regarding the potential advantage of HRM in public sector organizations in general, these findings might imply that different HR practices are required for public sector organizations compared to private organizations. It might be more appropriate to view HPWS from a best fit or contingency perspective, implying that (HR) managers need to tailor HPWS to their specific public sector context. Next to this, the results of this study provide no further evidence for the negative impact of monetary incentives on PSM. This non-finding might be explained by the fact that the payment level of the respondents is highly regulated. Collective labor agreements determine fixed wages for nursing staff working in both types of hospitals (public and private). Therefore, the German nursing sector might be an inappropriate field to investigate the effect of performance-related pay on autonomous motivation. It might be more applicable to use performance-based career opportunities as a proxy for the HR practice performance-based pay in this, and similar, contextual settings. Another explanation for this non-finding is given by Georgellis *et al.* (2011) who point out that the effect of rewards on motivation depends on the nature of the task. The non-finding might also be explained by the fact that public organizations often lack organizational and managerial characteristics which are necessary to make performance-based pay work (Perry *et al.*, 2006) and by the fact that employees did not perceive performance-based pay as controlling. As mentioned before, for the crowding out effect to become apparent, rewards need to be perceived as controlling and we did not include any items controlling for these perceptions.

Regarding the second objective of this study, our empirical findings support the usability of SDT in explaining the underlying mechanisms of the HPWS-PSM relationship. By demonstrating that basic psychological needs relate to both, HPWS and PSM, this study contributes to the question of how HPWS nourishes PSM. However, even though SDT provides a good explanation, it cannot exclusively explain the entire process as the final hypothesis (*H4*) (claiming a mediation effect) could not be verified by the data. In order to explain the interrelation to a greater extent, it might be necessary to include other variables and theories into the HPWS-PSM relationship. Following Perry and Vandenabeele (2008), social-cognitive theory and goal-setting theory might be useful as they provide alternative mechanisms for the transmission of organizational values to an individual level.

Against expectations, the data provides evidence for the variable relatedness to mediate the relationship between training and PSM. An explanation for this finding might be that the need for relatedness of employees having training possibilities will be satisfied because these individuals get to know their colleagues better during training sessions and therefore also feel more at ease at work. As predicted by SDT and supported by the data of this study, the satisfaction of relatedness, in turn, has a positive effect on PSM.

In summary, this study contributes to the current state of knowledge about the organizational antecedents of PSM and the mechanism explaining the link between HPWS and PSM by developing and testing a conceptual model that connects these two concepts using insights from SDT. This knowledge is theoretically important as it helps to understand the origins of PSM. By doing so, this knowledge also contributes to the theoretical selection-attraction and adoption-socialization discussion surrounding PSM (Wright and Grant, 2010). Are individuals with greater PSM attracted to work in

the public sector because of the opportunity to provide meaningful public service (Georgellis *et al.*, 2011; Pandey and Stazyk, 2008)? The results of this study provide empirical support for an alternative explanation. The level of PSM seems (at least also) to be the result of organizational influences.

5.3 Practical contributions

The results of this study should urge managers of nursing staff to consider the relevance of HR activities as a possibility to nourish PSM. Especially in times where the need for healthcare increases, it is important to have (public service) motivated personnel in the nursing sector. Using HR practices to foster PSM can be seen as an effective instrument for good performance and reduced turnover rates in times where money and resources are scarce (Coomber and Barriball, 2007). Our results show in particular that PSM is stimulated by the perception of consultation which can be enhanced by personal interviews or anonymous suggestion boxes in common rooms of nurses. Another HR practice which influences PSM and the need for autonomy and competence are job characteristics which refer to the judgment that one's job has a positive impact on others (Hackman and Oldham, 1976). Making the pro-social impact of the nursing job more salient is likely to have a positive direct and indirect (via the satisfaction of the needs for autonomy and competence) effect on PSM. This can be done at different levels. Line managers should provide nurses with frequent and work-related feedback. Next to this, it is also very important that top managers discuss recognition for the work of nursing staff in the public.

However, managers should also be aware that fostering PSM alone is not sufficient. Agencies also need to provide individuals with the opportunity to act upon their PSM in practice, as otherwise PSM employees might become frustrated (Steen and Rutgers, 2011) or might even resign (Giauque *et al.*, 2012; de Ruyter *et al.*, 2008).

5.4 Limitations and future research

Some limitations in this study should be considered that are raising a number of issues for future research. The first limitation of this study relates to generalizability. In this study, the macro-institutional context is held constant implying that the findings cannot necessarily be generalized in comparison to other countries next to Germany. However, as the education of nurses is regulated at the European level, we do not expect the German nursing context to be very different from other European countries. Knowing that PSM is influenced by the level of professionalism, future research should address the question whether the findings of this study, which are gained from a case with a medium level of professionalism, can be verified using data from an occupation that is scoring high on professionalism. The second limitation of this study relates to validity. Longitudinal data would have yielded better internal validity because it allows the researchers to make stronger causal claims. Measuring all variables using employee's self-reports is another limitation of this study as it increases the threat of CMB. Based on the results of the Harmans' single factor test, we are confident that the findings of this study are not affected by CMB. However, an important challenge for future research remains to find a more independent and objective way to measure HPWS. Another problematic aspect of this study relates to the fact that the instrument used to measure HPWS is a strongly modified version of the original instrument developed by Harley *et al.* (2007).

Together with the fact that this instrument measures four dimensions of HPWS by using only one item, construct validity of the concept is challenged. Finally, the dataset upon which this study is based is relatively small ($n = 251$). A larger sample size leads to more accurate parameter estimations and provides more chances to cancel out unrepresentative elements (Dooley, 2001).

In order to rule out the aforementioned limitations of this present study, we hope that future research will investigate the HPWS-PSM relationship across nations and among occupations by using a panel design. Next to this, we think that future research on this relationship will benefit from using a measurement instrument of HPWS that assesses the different HR practices by multiple items in order to better capture the construct's meaning, or even to use an instrument that assesses HPWS at multiple levels (e.g. Aryee *et al.*, 2012).

6. Conclusion

Based upon the presented data, it can be concluded that three dimensions of HPWS (job characteristics, training, and consultation) have a positive and significant effect on PSM and that all basic psychological needs (relatedness, competence, autonomy) play a role in the PSM-HPWS relationship. Basic psychological needs influence PSM and are, in turn, influenced by the HR practices job characteristics, consultation and training. However, against expectations, they do not mediate the relationship between PSM and HPWS completely. This means that, even though SDT provides a good explanation for the transmission of organizational variables to an individual level of PSM, the theory fails to explain the entire process. This requires the consideration of additional theories in order to better explain the mechanisms behind the organizational context-PSM relationship.

Despite the aforementioned limitations, the current study contributes to research surrounding PSM by combining different disciplines of research, developing a conceptual model explaining the link between HPWS and PSM, and providing empirical evidence of the unique contribution of certain HPWS and the basic psychological needs in fostering PSM. We are convinced that including SDT in studies examining organizational antecedents of PSM is productive.

Notes

1. In 2012, Kim *et al.* developed and tested an international instrument of PSM which addresses the concept as a four dimensional construct. Because the data of this study was collected in 2010, Vandenabeele's approach (2008) to PSM was used.
2. According to Wood *et al.* (2003), high commitment work systems, high involvement work systems and high performance work systems are used interchangeable by various researchers. In this study, the term high performance work systems (HPWS) will be used.
3. Following Deci and Ryan (2000), identified, integrated and intrinsic regulation can be seen as different types of internal regulation.
4. Workplace Employment and Relation Survey.

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Variables	Items
<i>PSM</i>	
PSM_CPI1	I voluntarily and unselfishly contribute to my community
PSM_CPI2	Serving the public interest is an important drive in my daily life
PSM_CPI3	To me, serving the public interest is more important than helping individual persons
PSM_CPI4	To me, before anything, good civilians should think of society
PSM_Comp1	To me, patriotism includes seeing to the welfare of others
PSM_Comp2	Fighting poverty is an important duty of the government
PSM_Comp3	I seldom think about the welfare of other people whom I do not know personally (R)
PSM_Comp4	Without solidarity, our society is doomed to fall apart
PSM_Comp5	To me, helping other people who are in trouble is very important
PSM_APPM1	“Politics” is a dirty word (R)
PSM_APPM2	I do not care much about politicians (R)
PSM_SS1	Much of what I do is for a cause bigger than myself
PSM_SS2	Making a difference in society means more to me than personal achievements
PSM_SS3	I feel people should give back to society more than that they get from it
PSM_SS4	I am prepared to make enormous sacrifices for the good of society
PSM_DG1	Everybody is entitled to a good service, even if it costs a lot of money
PSM_DG2	Even in case of major disaster, public service should be maintained
PSM_DG3	It is important that public servants account for all costs they make
<i>Basic needs</i>	
BPN_A1	The work I do is highly compatible with my choices and interests
BPN_A2	Even if I could, I would not change any processes of the work I do
BPN_A3	I feel that the way I do is definitely an expression of myself (P)
BPN_A4	I feel very strongly that I have the opportunity to make choices with respect to the way I do my work
BPN_C1	I have been making huge progress with respect to the carrier objectives I have in mind
BPN_C2	I feel that I am doing a good job at my workplace
BPN_C3	I feel that I can manage the requirements of the job I am involved in
BPN_C4	From time to time, I have doubts that I can go anywhere regarding my current work position (R) (X)
BPN_R1	I feel extremely comfortable when my colleagues are around
BPN_R2	I feel that I can associate with my colleagues in a very friendly way

(continued)

Table A1.
Descriptions of
the variables, items,
and coding

Variables	Items
BPN_R3	I feel that there are open channels of communications with my colleagues (P)
BPN_R4	I feel very much at ease with my colleagues
<i>Perceived HPWS</i>	
HPWS_SP	The employee selection process at this hospital was very rigorous involving tests, interviews, and work samples
HPWS_Training	Over the last 12 months, I had sufficient chances to participate in trainings (at least twice)
HPWS_perfBpay1	The wages in this hospital are not very competitive for this sector (R)
HPWS_perfBpay2	In this hospital, pay is not closely tied to individual performance (R)
HPWS_Consultation	When new nursing methods are introduced, I personally have a say in the decision about the changes
HPWS_OrgCom	I am informed about any changes in the organization of work and/or the working conditions
HPWS_AutoTeam1	I see myself as a member of a formally designated team
HPWS_AutoTeam2	The success of the team depends on team members working together
HPWS_AutoTeam3	Team members appoint their own leader
HPWS_AutoTeam4	Team members jointly decide how work is done
HPWS_AutoTeam5	Teams are given responsibility for particular tasks or services
HPWS_JobChar1	My job involves doing a whole piece of work from start to finish, and the results of my effort are easily seen in the health of the patient
HPWS_JobChar2	My job provides me with the chance to be completely involved in the recovery of patients
Notes: (R), reversed coding; (P), excluded from analysis on basis of pilot study; (X), excluded from analysis on basis of CFA	

	Autonomy				Competence				Relatedness			
	β_a (B)	β_b (B)	SEa	SEb	Z	β_a (B)	β_b (B)	SEa	SEb	Z	β_a (B)	β_b (B)
Job characteristics	0.201*** (0.446)	0.189*** (0.804)	0.143	0.260	0.65	0.162** (0.342)	0.175** (0.785)	0.138	0.275	0.58	0.049 (0.143)	0.283*** (0.920)
Consultation	0.136** (0.220)	0.189*** (0.804)	0.106	0.260	0.63	0.067 (0.2)	0.175** (0.785)	0.102	0.275	NA	0.25 (0.054)	0.283*** (0.920)
Training	0.148** (0.237)	0.189*** (0.804)	0.104	0.260	0.65	0.043 (0.065)	0.175** (0.785)	0.100	0.275	NA	0.205*** (0.431)	0.283*** (0.920)
Notes: NA, no significant path a (no mediation possible); M, already fully mediated, **,***Significant at <0.05 and <0.01 level, respectively (two-tailed)												

Table AII.
Testing partial
mediation effects
of the three basic
psychological needs
(Sobel test)

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