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Engagement and exhaustion in healthcare: a network approach

Engagement
and exhaustion
in healthcare

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Abstract

Purpose – Taking a network approach, the purpose of this paper is to investigate the social antecedents of work-related engagement and exhaustion in a sample of Dutch healthcare workers, examining how employees' structural position in the team (i.e. their centrality in the network) is associated with their engagement and exhaustion. Distinctions are made between instrumental networks (i.e. structural dependencies) and expressive networks (i.e. emotional connectedness through friendships).

Design/methodology/approach – Associations between job characteristics (quantitative demands, emotional demands and influence) and employees' centrality in the instrumental and expressive networks at work with their self-reported engagement and exhaustion were examined. Network centrality was assessed through a sociometric survey by the total number of nominations each employee received (in-degree centrality) or gave (out-degree centrality) and for both networks separately.

Findings – The results show that whereas job characteristics but not network centrality were associated with exhaustion, network centrality in the expressive network but not job characteristics was associated with engagement. In-degree centrality (being nominated by many co-workers as a friend) was positively associated with engagement, whereas out-degree centrality (nominating many co-workers as a friend) was negatively associated with engagement.

Originality/value – The results support recent findings concerning more multifaceted antecedents of engagement and exhaustion, and underline the importance considering social network characteristics in investigations of work engagement. On a methodological level, the differing results for in-degree and out-degree centrality underline the importance of not only relying on self-reported social relationships but to also capture other-reported data.

Keywords Exhaustion, Healthcare, Social networks, Work engagement

Paper type Research paper

Experiences of emotional exhaustion have been widely discussed as a work-related mental-health issue throughout the last years and even decades (e.g. Maslach and Jackson, 1981; Sonnentag, 2017). As a core component of burnout, exhaustion represents its basic stress dimension (Maslach *et al.*, 2001; Schaufeli and Van Dierendonck, 2000) and is hence considered to be a response to prolonged exposure to work-related strains (Bakker *et al.*, 2014; Maslach *et al.*, 2001; Schaufeli *et al.*, 2009). It is characterized by feelings of being mentally and physically depleted of one's capacities and being unable to meet the demands of one's job (Maslach and Leiter, 2008; Schaufeli and Van Dierendonck, 2000). Its adverse consequences reach from physical and psychological health issues to decreased job satisfaction and declines in performance, intentions to leave and turnover (Dreison *et al.*, 2018; Maslach *et al.*, 2001; Maslach and Leiter, 2008; Upadyaya *et al.*, 2016).

More recently, the concept of work engagement as "a positive, fulfilling, affective-motivational state of work-related well-being" (Bakker *et al.*, 2008, p. 187) has been introduced. It describes a state of high energy and high motivation and encompasses the three dimensions vigor, dedication and absorption (Bakker and Albrecht, 2018; Bakker *et al.*, 2008). Vigor denotes the



energy and effort an individual is willing and able to invest at work. Dedication and absorption describe employees' feelings of involvement and the significance they attach to their work, together with feelings of completely immersing themselves in their work, respectively. Engagement has been proven to be beneficial to both the individual employee and the organization through its links with increased motivation, enthusiasm and performance (Alessandri *et al.*, 2018; Bakker *et al.*, 2008; Upadyaya *et al.*, 2016). Although originally introduced as an antipode to burnout (Bakker *et al.*, 2008; Maslach and Leiter, 2008), recent studies suggest a more multifaceted relationship between the two concepts with partially overlapping profiles and antecedents (Goering *et al.*, 2017; Leiter and Maslach, 2016; Moeller *et al.*, 2018; Upadyaya *et al.*, 2016).

Research on work-related exhaustion has traditionally laid a strong focus on employees in the healthcare sector (Schaufeli *et al.*, 2009; van Mol *et al.*, 2015). This is not surprising, considering that employees in the healthcare sector work in a uniquely stressful environment in which they take on substantial responsibilities for their patients' health and which exposes them to a wide range of emotional experiences and traumatic life events of their patients. In addition, the healthcare sector is often under financial strain, frequently resulting in understaffing and an increased workload for individual employees (Dreison *et al.*, 2018; Sørgaard *et al.*, 2007). Healthcare workers thus represent a high-risk group for work-related exhaustion. At the same time, to buffer the effects of increasing stress and workloads, employees in the healthcare sector might greatly benefit from increased work engagement. Due to the prevalence of exhaustion among healthcare workers and the substantial benefits that employees in this sector might derive from insights into the antecedents of high engagement, the present study focuses on the investigation of (social) antecedents of engagement and exhaustion among healthcare workers.

In most contemporary working environments and especially in the healthcare sector, teamwork is an integral part of working lives. Consequently, organizational researchers have laid a strong focus on the social dynamics of the workplace and its associations with employees' well-being (e.g. Hakanen *et al.*, 2013; Kilduff and Brass, 2010). More recently, research focusing on social interactions and group dynamics has increasingly drawn on social network approaches to explain individuals' behavior and affect at work, including the experience of exhaustion and engagement (Bakker *et al.*, 2006; Köppe *et al.*, 2018). The present study seeks to extend this line of research by taking a network approach to address the question how employees' networks within their work teams are associated with their work-related engagement and exhaustion.

Job demands and resources as antecedents of engagement and exhaustion

Investigations of the antecedents of engagement and exhaustion are often framed within the job demands-resources theory (Bakker and Albrecht, 2018; Bakker and Demerouti, 2016; Bakker *et al.*, 2014; Demerouti *et al.*, 2001; Goering *et al.*, 2017). Job demands denote the physical, social, psychological and organizational demands of a job that employees must meet. Job resources denote the job characteristics that are functional to employees' goal achievement and that hold the capacity to buffer the adverse effects of increasing job demands (Demerouti *et al.*, 2001). According to the job demands-resources theory, exhaustion results from a mismatch between the person and the job insofar as the demands of the job exceed the individual's resources (Bakker *et al.*, 2014; Maslach and Leiter, 2008). Similarly, the availability of job resources such as social support, feedback, influence and control over one's job predict work engagement (Schaufeli *et al.*, 2009), with job control being one of the strongest predictors (Mauno *et al.*, 2007). A recent meta-analysis points to a more complex pattern between job demands and resources and employees' engagement and exhaustion (Goering *et al.*, 2017). While high job demands that are perceived as a hindrance to task completion are associated with exhaustion and burnout, as can be expected from the job demands-resources theory, high

job demands that are perceived as challenging are equally associated with both exhaustion and engagement. In line with job demands-resources theory, work resources are positively associated with engagement and negatively associated with exhaustion and burnout (Goering *et al.*, 2017).

Social antecedents of engagement and exhaustion

Previous studies have repeatedly demonstrated that social relationships at work can buffer the effects of high job demands on exhaustion and at the same time improve employees' work engagement (e.g. Bakker *et al.*, 2005; Bakker and Demerouti, 2016; Goering *et al.*, 2017). Likewise, employees in the healthcare sector who received greater social support from their supervisors or friends have been found to show lower levels of exhaustion (e.g. Woodhead *et al.*, 2014), demonstrating a buffering effect of social relationships on employees' experience of work-related exhaustion. These studies demonstrate that social relationships can both serve as a buffer against work-related exhaustion and positively affect employees' engagement. Stated differently, social relationships can serve as a resource to employees. However, there is one major characteristic that differentiates social relationships from other types of job demands and job resources: whereas the job demands and resources that are traditionally addressed in research on the job demands-resources theory are often rooted within the organizational structure or the nature of the work itself (e.g. the workload or the type of tasks), this is not the case for social relationships at work. Instead, social relationships are often engrained in employees' ties with their co-workers and hence within their social networks at work. Consequently, researchers have increasingly investigated the association between employees' social ties with their co-workers and their work-related affect. For instance, one line of research has explored the possibilities of emotional crossover at work, which is presumed to occur when a person's emotional experience is influenced by the emotional experience of another person in the same social context (Hakanen *et al.*, 2013). It was shown that work stress and exhaustion may indeed crossover between co-workers and between employees and their leaders (e.g. Bakker *et al.*, 2006; Hakanen *et al.*, 2013). Similarly, Totterdell *et al.* (2004) investigated the association between employees' social networks at work and their work-related positive and negative affect, showing that similarities in affect among co-workers depend on the presence of work ties connecting them.

Together, these findings on the social antecedents of engagement and exhaustion and especially on the role of social relationships raise the question how employees' social connections with their co-workers are associated with their engagement and exhaustion.

To shed light on this question, the present study takes a social network approach and investigates employees' connectedness with others within their work teams and their work-related engagement and exhaustion.

Network centrality as an antecedent of engagement and exhaustion

A social network denotes the relationships that link people together, often with respect to an outcome variable to be explained by the network structure. It examines how people within a group or team are linked together by a variety of social ties. These ties can be friendship-, work-related or other types of relationships. Every person is part of a variety of different social networks, depending on the respective social context. For example, someone can be both a friend and a co-worker to the same person. Organizational social networks can be characterized at the hand of several characteristics. One such characteristic is network centrality. Centrality refers to a person's structural position in the network (Borgatti *et al.*, 2009). One indicator of centrality is the number of other people to whom a person is connected (i.e. this person's network degree). There is a distinction between out-degree or outgoing ties (e.g. the number of co-workers a person names as a friend) and in-degree or incoming ties (e.g. the number of co-workers that nominate a person as a friend).

Degree centrality is thus an indicator of a person's connectedness to others in the network, with high centrality being associated with greater prominence, power and influence within the group (e.g. Borgatti *et al.*, 2009).

Network centrality as an antecedent of engagement

According to the job demands-resources theory, employees' power and influence over their work can be regarded as a work-related resource. In line with this assumption, Totterdell *et al.* (2004) argued that the greater connection of central persons in a network provides them with more access to and control over resources and hence should be related to positive work-related affect. Indeed, they found that centrality was associated with increased enthusiasm at work. Likewise, Mauno *et al.* (2007) have shown that job control is a strong predictor of work engagement. In addition to resources such as influence and control, employees who are central in the network are connected to many people whom they can approach for help and support, thus also providing them with greater access to social resources. Together, these findings strongly suggest that as employees' network centrality provides them with power, influence, control and opportunities for support; it can be regarded as a work-related resource that comes with the same benefits as other work-related resources do. Hence, the following is hypothesized:

- H1. Like other work-related resources, high network centrality is positively associated with work engagement.

Network centrality as an antecedent of exhaustion

However, with great power comes great responsibility and network centrality might come at a price. Whereas the influence and power that comes with greater network centrality may clearly represent a resource to employees, it may also place increased demands on them. For example, employees' greater prominence, power and influence within the group may also be perceived as a burden to them as their level of control over their work confronts them with many decisions throughout the day, turning it into a demand rather than a resource. Likewise, centrality in the network might not only provide employees with the opportunity to approach many of their co-workers for help and support but also provide many of their co-workers with the opportunity to approach them for help and support, making them a potential social resource to other people. Consequently, network centrality is not only associated with increased positive work-related affect (Mauno *et al.*, 2007; Totterdell *et al.*, 2004) but also with increased negative work-related affect such as anxiety (Totterdell *et al.*, 2004). Stated differently, network centrality may not only be a work-related resource but might also represent a demand to employees and elicit the same consequences as other job demands do. It is therefore hypothesized that:

- H2. High network centrality is positively associated with exhaustion.

Network centrality: expressive and instrumental social ties

Organizational social networks further distinguish between two types of social ties: expressive and instrumental ties (e.g. Gibbons, 2004; Umphress *et al.*, 2003). Expressive ties are trust-based exchange relationships between co-workers that indicate emotional attachment or friendship and allow them to discuss sensitive issues that they would not share with non-friends (Gibbons, 2004; Umphress *et al.*, 2003). Instrumental ties are work-related relationships representing employees' interdependencies in the workflow structure. Looking at the nature of social ties might provide first hints at the mechanisms associated with exhaustion and engagement at work. Specifically, expressive networks point toward emotional mechanisms, whereas instrumental networks point toward

mechanisms that origin in employees' structural interdependencies. The present study will thus address the distinct associations between both expressive and instrumental social ties with exhaustion and engagement in an exploratory manner.

Method

Participants and procedure

Data were collected from $N = 90$ nurses working in four teams at a general hospital in the Netherlands ($n1 = 17$, 100 percent female, M age = 36 years, $SD = 9.6$; $n2 = 26$, 100 percent female, M age = 38 years, $SD = 10.9$; $n3 = 17$, 100 percent female, M age = 39.8 years, $SD = 12.2$; $n4 = 30$, 100 percent female, M age = 44 years, $SD = 10.9$). Participants were approached during regular working hours. Where possible, questionnaires were completed during regular working hours, as well. If not, participants received the questionnaire and a stamped envelope to return it to the researcher. Confidentiality was assured and informed consent was obtained beforehand.

Measures

Engagement. Engagement was assessed with the Utrecht Work Engagement Scale (Schaufeli and Bakker, 2003), a 17-item scale that taps the three dimensions of work engagement: vigor, dedication and absorption. Participants responded on a seven-point Likert scale to statements about their feelings toward their work, asking them to indicate how often these statements applied to them (0 = never, 6 = always). Items consisted of statements such as "At my work, I feel bursting with energy" (vigor), "I find the work that I do full of meaning and purpose" (dedication) and "I feel happy when I'm working intensely" (absorption). Reliability analysis indicated good reliability of the overall measure (Cronbach's $\alpha = 0.91$).

Exhaustion. Exhaustion was assessed with the exhaustion subscale of the Utrecht Burnout Scale (Schaufeli and Van Dierendonck, 2000), a validated Dutch translation of the Maslach Burnout Inventory (Maslach and Jackson, 1981). Participants were asked to respond on a seven-point Likert scale (0 = never, 6 = always) to five items such as "I feel emotionally drained from my work." The measure proved to be reliable with Cronbach's $\alpha = 0.88$.

Social networks. A sociometric section including questions about participants' network ties was included in the questionnaire. Participants were asked to nominate co-workers whom they considered to be a friend (expressive network) and whom they structurally depended on to complete their work (instrumental network). Nominations were restricted to participants' immediate team. Self-nominations were not possible and there was no maximum number of possible nominations. As the focus is on directed networks (meaning that nominations did not need to be reciprocated), network ties were arranged separately for each team into non-symmetric matrices. For example, if participant i nominated participant j , then cell X_{ij} of the matrix was coded as 1. In case of no nomination, the cell in the matrix was coded as 0. Matrices were created separately for expressive and instrumental networks. The average response rate within teams was 55.25 percent, indicating that although on the lower end, a representative part of the networks within teams was assessed.

Network centrality. Centrality was operationalized as participants' in-degree and out-degree in their instrumental and expressive networks. In-degree centrality was assessed by the sum of all nominations a participant received. Out-degree was assessed by the sum of all nominations a participant made. Sums were calculated separately for expressive and instrumental networks. To account for differences in team size, scores were standardized within teams.

Job characteristics. Job characteristics were included as control variables and measured with 19 items from the Copenhagen Psychosocial Questionnaire (e.g. Kristensen *et al.*, 2005), using the subscales assessing quantitative job demands, emotional job demands and employee influence. Participants were asked to respond on a five-point Likert scale

(1 = never, 5 = always) to six questions tapping their quantitative job demands (e.g. “How often do you get behind with your work?”), three items tapping their emotional job demands (e.g. “How often does your work put you into emotionally disturbing situations?”) and ten items tapping their influence over their work (e.g. “To what extent can you influence the amount of work assigned to you?”). Reliability analyses indicated good reliability of all subscales ($\alpha = 0.81$ for quantitative demands, $\alpha = 0.80$ for emotional demands and $\alpha = 0.74$ for influence).

Results

Table I presents means and correlations of the main study variables. As the respondents in the current sample are nested within teams, we first examined the variability of the two dependent variables on the team level to establish whether multilevel analysis was required to adequately account for this nested structure of the data. A multilevel null model with “team” as second-level random effect was estimated for both engagement and exhaustion. The results show an intraclass correlation of zero for engagement and approximately zero (< 0.001) for exhaustion. These results show that the clustering of employees within teams does not help to explain the variability within exhaustion and engagement in the current sample and that applying multilevel analysis does not provide any benefits to the analysis. To test the hypotheses, we therefore conducted two separate regression analyses to investigate the associations between participants’ network centrality and their engagement (Model 1) and exhaustion (Model 2). Age (Step 1) as well as quantitative demands, emotional demands and influence (Step 2) were entered as control variables. Due to recent findings pointing toward more multifaceted relationships between job demands and job resources with different buffering effects (e.g. Goering *et al.*, 2017), the two-way interactions between the three job characteristics were added in Step 3. In Step 4, the network variables were added. The results are displayed in Table II.

The results of Step 1 show that age is significantly associated with engagement (Model 1), with older participants showing higher engagement than younger participants do ($\beta = 0.21$, $p < 0.05$). Age is, however, not associated with exhaustion, suggesting that neither older nor younger employees are more prone to the experience of exhaustion (Model 2).

Job characteristics

Analyses of the associations between job characteristics and employees’ engagement surprisingly show that none of the job characteristics is associated with engagement (Model 1, Step 2). Analyses of employees’ exhaustion (Model 2, Step 2) show that, as can be expected, quantitative job demands ($\beta = 0.25$, $p < 0.01$) and emotional job demands ($\beta = 0.38$, $p < 0.01$) are positively associated with exhaustion with employees who face

	M	SD	1	2	3	4	5	6	7	8
1. Exhaustion	1.3	0.90								
2. Engagement	4.45	0.70	-0.22*							
3. Quantitative	2.73	0.58	0.30**	0.17						
4. Emotional	3.14	0.78	0.41**	0.00	0.11					
5. Influence	2.87	0.54	0.01	0.02	-0.01	0.06				
6. Instrumental out-degree	0.07	0.07	0.02	0.04	-0.10	0.22*	-0.03			
7. Instrumental in-degree	0.07	0.15	-0.02	0.19	0.36**	-0.07	0.19	-0.07		
8. Expressive out-degree	0.09	0.09	0.16	-0.10	0.18	0.09	0.16	0.12	0.13	
9. Expressive in-degree	0.09	0.10	0.03	0.20	0.19	-0.10	0.07	-0.03	0.30**	0.56**

Table I.
Correlations and
descriptive statistics

Notes: $N = 90$. Means and standard deviations for centrality scores based on proportions relative to team sizes. * $p < 0.05$; ** $p < 0.01$

	Engagement (Model 1)			Exhaustion (Model 2)		
	ΔR^2	β	SE	ΔR^2	β	SE
Step 1	0.05*			0.10		
Age		0.21*	0.01		-0.10	0.01
Step 2	0.03			0.23**		
Quantitative demands		0.18	0.13		0.25**	0.16
Emotional demands		0.00	0.09		0.38**	0.10
Influence		0.03	0.14		0.00	0.16
Step 3	0.03			0.05		
Quantitative \times Emotional		-0.19	0.10		0.11	0.11
Quantitative \times Influence		0.07	0.11		0.07	0.13
Emotional \times Influence		0.07	0.07		-0.17	0.08
Step 4	0.10*			0.02		
Instrumental (out-degree)		0.08	0.08		0.00	0.09
Instrumental (in-degree)		0.04	0.08		-0.10	0.10
Expressive (out-degree)		-0.36**	0.10		0.14	0.12
Expressive (in-degree)		0.37**	0.10		-0.04	0.12
Total R^2	0.22**			0.30**		

Notes: * $p < 0.05$; ** $p < 0.01$

Table II.
Regression results predicting engagement and exhaustion

higher quantitative demands (e.g. a higher workload) and higher emotional demands (e.g. challenging or disturbing emotional situations) reporting higher levels of exhaustion. Their possibilities to exert influence over their work are not associated with exhaustion. None of the interaction terms added in Step 3 reached significance.

Network centrality

In a fourth and final step, the variables concerning employees' centrality in the instrumental and expressive networks have been included in the model. Concerning employees' engagement (Model 1, Step 4), the results show that centrality in the instrumental network is not associated with engagement. However, in the expressive network, both in-degree and out-degree centrality are significantly associated with engagement, though in different directions. In-degree centrality in the expressive network is positively associated with engagement ($\beta = 0.37, p < 0.01$), showing that people who were nominated as a friend by many of their co-workers were more engaged than people who received fewer nominations as a friend. Out-degree centrality was negatively associated with engagement ($\beta = -0.36, p < 0.01$), showing that people who themselves nominated many of their co-workers as a friend were less engaged than people who nominated fewer of their co-workers as a friend. *H1* concerning the association between employees' engagement and their network centrality is thus supported for expressive but not for instrumental networks, with the interesting finding of opposite associations depending on whether employees nominate a co-worker as a friend or are themselves nominated as a friend by others. The results concerning exhaustion (Model 2, Step 4) show that none of the centrality measures is significantly associated with employees' experiences of exhaustion, thereby rejecting *H2*.

Discussion

The aim of the present study was to investigate the associations between instrumental (i.e. structural interdependencies) and expressive (i.e. friendships) social networks in the workplace and the experience of engagement and exhaustion among employees in the healthcare sector. It was investigated whether employees' who are central in their networks at work and hence have greater power, influence and access to social resources (Borgatti *et al.*, 2009; Totterdell *et al.*, 2004) were more engaged due to this central position and their

access to resources. At the same time, occupying a central position in a network might come at a cost. Being influential and having many friends is not only a resource but can also place increased demands on people. Therefore, next to engagement, the association between network centrality and exhaustion was investigated, as well. In both networks, it was distinguished between out-degree centrality, that is, the degree to which employees themselves reported to be friends with many co-workers (expressive network) or to be structurally dependent on many co-workers to complete their work (instrumental network) and in-degree centrality, that is, the degree to which employees were nominated by their co-workers as someone they were friends with (expressive network) or on whom they structurally depended to complete their work (instrumental network).

Engagement is associated with centrality in the expressive but not the instrumental network
The results show that centrality in the expressive network in terms of both in-degree and out-degree was significantly associated with engagement, though in different directions. Employees who received many nominations as a friend by their co-workers (high in-degree centrality) were more engaged than participants who received fewer nominations as a friend. This finding is in line with earlier research showing that higher centrality is associated with higher enthusiasm at work (Totterdell *et al.*, 2004) and can possibly be explained by the greater opportunity for social support that a large friendship network provides, as social support has been found to predict work engagement (Schaufeli *et al.*, 2009). Similarly, research on social capital in organizations suggests that people derive benefits from their social network connections in a variety of ways, and that positive social relationships may enhance people's job satisfaction (e.g. Alessandri *et al.*, 2018; Kilduff and Brass, 2010). The findings of the present study support this notion by showing that higher numbers of received nominations as a friend are indeed related to higher engagement. However, due to the cross-sectional nature of the current study, we cannot rule out that initial engagement results in more friendship nominations. It has been shown that people who are perceived to be connected to prominent others will themselves be evaluated more positively by their social environment (Kilduff and Krackhardt, 1994). Therefore, employees may be inclined to nominate more engaged co-workers as a friend to enhance their own reputation.

Surprisingly, participants who themselves nominated many co-workers as a friend (out-degree centrality) were significantly less engaged. At first sight, this seems counterintuitive, especially regarding the increased opportunity for social support provided by a larger number of friends. However, network ties were analyzed in a non-symmetric manner, meaning that individual friendship nominations need not be reciprocated. Nominating a larger number of co-workers as a friend is thus not equal to having many friends and hence not necessarily associated with increased opportunity for social support. It is possible that low work engagement is the precursor of a large self-reported friendship network. As interpersonal relationships in the workplace may enhance employees' experiences of their work (Kilduff and Brass, 2010), employees who perceive their work as less engaging may attempt to enrich their jobs by trying to make friends in the workplace. Hence, nominating many friends may be an expression of employees' effort to mobilize social resources.

Concerning employees' centrality in the instrumental network, the results show that neither in-degree nor out-degree centrality in the instrumental network was associated with engagement. Employees' were not more or less engaged depending on whether they structurally depended on many of their co-workers or many of their co-worker structurally depended on them. However, this finding is less surprising if one considers that, other than in the expressive network, centrality in the instrumental network is not necessarily a resource but can also place a burden on employees who might feel pressured if there are many others who are structurally dependent on their performance. Centrality in the instrumental network may thus be a double-edged sword as instrumental ties may be a

resource in terms of power and influence over other people's work but also a demand if people feel pressured by these structural dependencies. The absence of an association in either direction shows that neither appears to be the case in the present sample. The results further show that contrary to what could have been expected from the job demands-resources theory (e.g. Bakker *et al.*, 2005), engagement was not associated with any of the job characteristics under study.

Exhaustion is not associated with network centrality

Centrality in both the instrumental and expressive network was not associated with exhaustion. Concerning the instrumental network, the absence of any significant association underlines the assumption made above that employees in the present sample appear to neither perceive their structural dependencies as a resource nor as a burden. If employees had perceived their own dependencies on others' work or the dependencies of others on their work as a demand that is placed on them, a positive association with exhaustion could have been expected. Interestingly, the results again underline that centrality in the instrumental network neither seems to be a resource nor a demand. Although centrality in the expressive network can be conceptualized as a social resource, an assumption that is supported by the positive associations with engagement presented above, neither in-degree nor out-degree centrality in the expressive network was associated with employees' exhaustion, showing that exhaustion is unrelated to the presence or absence of friendship ties in the present sample. As can be expected from the job demands-resources theory and the results of previous studies on this topic (e.g. Bakker *et al.*, 2005; Bakker and Albrecht, 2018; Goering *et al.*, 2017), both quantitative and emotional job demands were positively associated with exhaustion.

Together, these results form an interesting pattern. Whereas exhaustion is associated with job characteristics but not with network centrality, the opposite pattern was found for engagement. This finding is even stronger considering that engagement was significantly associated with employees' centrality in their expressive but not their instrumental networks. Whereas the first is an indicator of employees' friendship ties in the workplace and represents their emotional connectedness to others, the latter is an indicator of structural dependencies and represents employees' work-related interdependencies. The finding that employees' structural connection via instrumental ties is not associated with their experience of engagement fits with the earlier finding that engagement is also not associated with job characteristics. This suggests that engagement is less determined by the characteristics of the work itself but more by the emotional facets of the work. Thus, even though the concept of work engagement has initially emerged from research on burnout and exhaustion in the workplace (Bakker *et al.*, 2008; Maslach and Leiter, 2008), not all common predictors of exhaustion lend themselves equally well for the investigation of engagement. Whereas job characteristics may explain exhaustion, they may not be able to fully explain engagement, as the latter seems to be more strongly associated with the emotional aspects at work. This finding supports recent findings demonstrating that the connection between exhaustion and engagement and their predictors are highly complex and multifaceted (Goering *et al.*, 2017; Moeller *et al.*, 2018; Upadyaya *et al.*, 2016) and at the same time emphasizes the importance of considering expressive social networks in explanatory models of engagement.

Strengths and limitations

By focusing on the social networks of the workplace, this study takes an innovative approach to the investigation of exhaustion and engagement that sheds light on the complex associations between employees' social relationships at work and their work-related affect. However, this study also faces limitations. First, social networks were assessed at one time-point. Although not a direct disadvantage, a longitudinal design could provide additional information about the co-evolution of social networks and disentangle selection and influence effects. Second, the

response rate in the present study was on the lower end. However, especially for the calculation of out-degree centrality, this is of no greater concern, as this measure is calculated based on the outgoing nominations, which is not affected by the response or non-response of respondents' co-workers. The individual scores for in-degree centrality may, however, be affected by response rates if non-respondents are not missing randomly. The descriptive statistics show that for both networks, in-degree and out-degree centrality scores largely resemble each other with an average of 0.9 and 0.7 nominations, respectively, showing that the response rate is most likely of minor concern in this case. Third, the sample consisted of female employees only. The absence of male participants is surely an artifact of the profession under study, employees in the healthcare sector, but restricts the generalizability of the results. It thus remains to be investigated how the results can be generalized to other occupations or sectors. The healthcare sector is a very distinctive working environment which not only places high workloads on employees, but which is by nature also emotionally demanding (Dreison *et al.*, 2018; Sørgaard *et al.*, 2007). This emotional burden of employees in healthcare may affect the way expressive networks evolve. Future studies should aim to replicate the findings of the present study in different vocations.

Implications and conclusion

In sum, two main implications can be drawn from the present study. First, engagement is associated with employees' (expressive) network centrality but not with job characteristics. This suggests that the investigation of engagement may greatly benefit from approaches that go beyond job characteristics and cover the network structures at work. Organizations can thus be advised to especially address the network structures of the job if they want to stimulate engagement. Second, the differences between in-degree centrality and out-degree centrality in expressive networks and hence between other-reported (in-degree) and self-reported (out-degree) ties bears substantial methodological implications. Most of the studies that capture social antecedents of engagement and exhaustion have relied on employees' self-reported information on their social relationships (e.g. Alessandri *et al.*, 2018; Bakker *et al.*, 2005; Schaufeli, 2015). The present study demonstrates that other-reported information on social relationships provides valuable information about the complex associations between social relationships and work-related affect that should not be overlooked.

In conclusion, the findings of the present study clearly contribute to our understanding of the social processes within work teams and emphasize the importance of considering social network characteristics in research on employees' affective experiences of their work.

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Further reading

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