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THE INTRICATE PATHWAYS FROM EMPOWERING LEADERSHIP TO BURNOUT: A DEEP DIVE INTO INTERPERSONAL CONFLICTS, WORK-HOME INTERACTIONS, AND SUPPORTIVE COLLEAGUES

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ABSTRACT

Aim/Purpose	This study builds upon existing research by investigating the elements contributing to or buffering the onset of burnout symptoms. We examine the relationship between empowering leadership and burnout, considering the concurrent mediation effects of interpersonal workplace conflict, work-home conflict, and support from coworkers.
Background	Burnout is a phenomenon that has been widely considered in the scientific literature due to its negative effect on individual and organizational well-being, as well as implications for leadership, coworker support, and conflict resolution. A deeper understanding of burnout prevention strategies across various professional contexts is paramount for enhancing productivity and job satisfaction.
Methodology	Using a survey-based cross-sectional design, we employed a combination of Structural Equation Modelling (SEM) and Artificial Neural Network (ANN) to

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	investigate the direct and indirect influences of empowering leadership on four dimensions of employee burnout, mediated by coworker support, interpersonal conflict at work, and work-home conflict.
Contribution	This study provides initial insights into the direct and indirect influences of empowering leadership on various dimensions of burnout, highlighting the complex interplay with coworker support, work-home conflict, and workplace interpersonal conflicts. Ultimately, the study provides a comprehensive approach to understanding and mitigating burnout.
Findings	Empowering leadership and coworker support can significantly reduce burnout symptoms, while high levels of work-home conflict and interpersonal conflict at work can exacerbate them. Our findings underscore the paramount role of interpersonal conflict in predicting burnout, urging organizations to prioritize resolving such issues for burnout prevention.
Recommendations for Practitioners	Following our findings, organizations should (a) promote empowering leadership styles, (b) foster coworker support and work-life balance, and (c) address interpersonal conflicts to reduce the likelihood of employee burnout while ensuring that these strategies are tailored to the specific context and culture of the workplace.
Impact on Society	The findings inform policy and organizational practices aimed at fostering healthier work environments, reducing employee burnout rates, and consequently improving overall societal well-being and productivity.
Future Research	Future research should broaden the exploration of leadership styles' effects on burnout, identify additional mediators and moderators, expand studies across sectors and cultures, examine differential impacts on burnout dimensions, leverage advanced analytical models, and investigate the nuanced relationship between work contract types and burnout.

Keywords	burnout, empowering leadership, coworker support, interpersonal conflicts at work, work-home conflict, structural equation modeling, artificial neural network

INTRODUCTION

Burnout can lead to severe negative consequences for individuals' physical and psychological well-being (Mazzetti et al., 2022; Russo et al., 2020) and hinder organizational outcomes and companies' performance (Maslach et al., 2001), which underlines the importance of burnout prevention (Otto et al., 2021). According to Schaufeli (2018), the prevalence of burnout was about 10% among workers in European countries and 17% among workers in non-European countries in 2015. In the United States, Pendell (2018) reported that 28% of Millennials suffer from burnout frequently or constantly, compared to 21% of all workers belonging to an older generation.

The prevalence of burnout has been studied mainly in the healthcare context, focusing on, for instance, students and professional clinicians (Warlick et al., 2021), frontline medical staff (McFarland & Hlubocky, 2021), oncologists (Abusanad et al., 2022), paramedics (Reardon et al., 2020), and mental health professionals (Yang & Hayes, 2020). Another occupational sector particularly vulnerable to burnout is the educational sector, with studies focusing on students (Kaggwa et al., 2021; Sorrel et al., 2020), teachers, and professors (Fernández-Suárez et al., 2021; Fiorilli et al., 2019). To the best of our knowledge, research on burnout onset and protective factors has predominantly focused on the medical and academic professional contexts. More research is needed to explore the prevalence, risk factors, and outcomes of burnout across further occupational fields to enhance our understanding of this phenomenon in diverse professional contexts. Understanding factors protecting employees from

burnout symptoms can help organizations and individuals proactively address and prevent burnout, improving well-being, job satisfaction, and productivity. What is more, addressing these timely issues can serve to provide initial information to a wider public with the wish to raise awareness about burnout to a wider public (Tommasi, 2023)

The present work embarks on an investigation into the complex dynamics contributing to burnout within the work environment. To unravel these dynamics, it adopts a hybrid analytical approach. First, it applies Structural Equation Modelling (SEM) to reveal underlying connections and dependencies between various factors and burnout. Next, it utilizes an Artificial Neural Network (ANN) to model and predict the symptoms of burnout. The research uncovers patterns that influence different facets of burnout, underscoring the vital role of supportive work environments and effective management strategies. The study concludes by outlining actionable recommendations for reducing burnout, as well as suggesting avenues for future research.

The literature on burnout recognizes leadership and supervision as crucial organizational factors in buffering burnout and its detrimental consequences (Maslach, 2017). Empowering leadership – a leadership style that encourages self-directed decision-making – has emerged as a critical factor in overcoming employee burnout (Ahearne et al., 2005). Such leaders share power, encourage autonomy, and encourage proactive problem-solving, creating a work environment conducive to employee well-being and resilience (Fong & Snape, 2015). Research has shown that empowering leadership, emphasizing shared decision-making, and fostering a sense of competence among employees can help reduce burnout by increasing job satisfaction and reducing stress (Spence Laschinger et al., 2001).

Likewise, coworker support plays a crucial role in reducing burnout levels. Indeed, in supportive environments, employees can share stressors and solve problems together, reducing the risk of burnout (Ducharme & Martin, 2000; Halbesleben, 2006). Conversely, because of its stress-inducing nature, interpersonal conflicts in the workplace can increase the risk of burnout and potentially negate the positive effects of leadership strengthening (De Dreu & Weingart, 2003). Similarly, work-home conflict, in which competing demands of work and personal life produce a form of role stress, has been associated with increased burnout and may also weaken the effects of leadership style on employee well-being (Lundqvist et al., 2022). Investigating the relationship between empowering leadership and burnout, considering the role of colleague support and interpersonal conflicts at work and work-home conflicts, may help organizations develop a comprehensive strategy to combat employee burnout.

In the rest of the paper, we proceed as follows. First, we focus on the theoretical contributions that served as our basis in formulating our hypotheses. Then, we present the method and statistical analyses performed. Next, we present the results which are later discussed in light of the scientific literature. Limitations, strengths, and practical implications of our work are highlighted.

LITERATURE REVIEW

BURNOUT IN THE JOB-DEMAND RESOURCES MODEL

Burnout was defined by Maslach and Jackson (1981) as a syndrome encompassing emotional exhaustion, depersonalization, and diminished personal accomplishment. Exhaustion, the core component of burnout, can be defined as a "chronic state of emotional and physical exhaustion" (Cropanzano et al., 2003). In particular, exhaustion refers to an individual feeling overwhelmed and drained of resources and physical and psychological energies. According to recent findings (Aw et al., 2021), depersonalization refers to a negative, overly distant reaction toward the recipients of one's service or care, and decreased personal performance reflects feelings of incompetence and lack of success at work. This conceptualization of burnout is widely accepted and has guided research in the field (Maslach & Leiter, 2008). In 2019, the World Health Organization (WHO, 2019) included burnout as an "occupational phenomenon" in the International Categorization of Diseases (ICD-11). In the last

decades, burnout has become a core concept in occupational health psychology and has become a global issue due to its significant social and economic impact, especially in terms of lost productivity, sick leave, and employee turnover (Dyer, 2019). This situation has actually worsened over the past three years, influenced in part by the COVID-19 pandemic. Research reported adverse effects of COVID-19 on psychological well-being across different work environments and occupations (Aguiar-Quintana et al., 2021; Chen & Eyoun, 2021; Paganin et al., 2023). A study involving 44 countries revealed a significant increase in stress symptoms, including burnout symptoms, after the pandemic (Couarraze et al., 2021; Jalili et al., 2021). For example, a large-scale global study conducted in 60 countries during the COVID-19 pandemic revealed that more than half of health professionals worldwide suffered from burnout, which is significantly higher than the numbers identified in previous studies before the pandemic (Morgantini et al., 2020).

Empirical evidence underlines the role of situational and individual factors as the leading cause of burnout. The Job Demands-Resources (JD-R) model proposed by Demerouti et al. (2001) and more recently revised by Bakker and Demerouti (2014) has been the most popular framework for understanding the etiology of burnout over the last two decades. According to the JD-R model, worker well-being is determined by: (1) job demands, i.e., those aspects of the job that require physical and mental effort; and (2) job resources, i.e., the "protective factors" that enable workers to meet the demands and that promote learning and development. The model assumes that demands and resources initiate two parallel and opposed processes. According to the health impairment process, prolonged exposure to excessive job demands can lead to burnout if adequate job resources are lacking. Job resources, on the other hand, are the main trigger for the motivation process. They influence employees' engagement at work and the resulting outcomes, especially in the form of commitment and better work performance. Furthermore, a lack of resources prevents employees to meet work expectations, discourages work engagement, and leads to disengagement or withdrawal, a key component of burnout (Bakker et al., 2023). The role of resources concerning burnout was found to be less robust but consistently negative, particularly in relation to the cynicism component (Demerouti et al., 2001). These findings suggest the critical role that empowering leadership, peer support, and conflict management can play in cushioning job demands and preventing burnout (De Dreu et al., 2001).

The conceptualization of burnout and its instrument (Maslach Burnout Inventory) proposed by Maslach and Leiter (2008) has undoubtedly prevailed in the literature dealing with the topic. Despite its remarkable success, the MBI has been criticized on conceptual, methodological, and practical grounds. Attempting to overcome those incongruencies and limitations, Schaufeli, Desart, and De Witte (2020) and Schaufeli, De Witte, and Desart (2020) developed the Burnout Assessment Tool (BAT), which operationalizes burnout as a syndrome that brings together four interrelated core components: exhaustion (i.e., the depletion of physical and mental resources), mental distance (i.e., a sense of indifference towards one's work and dissatisfaction with its importance), emotional impairment (i.e., the overwhelming negative emotions related to daily tasks); and cognitive impairment (i.e., lack of concentration, attention, and memory functioning). Research attested to the reliability and factor validity of the Italian version of BAT and its convergent and discriminant validity compared with the Maslach Burnout Inventory (Consiglio et al., 2021; Mazzetti et al., 2022). These findings corroborate the assumption that burnout should be more accurately considered as a unitary syndrome stemming from the combination of four principal components (exhaustion, mental distance, cognitive impairment, and emotional impairment) constituting a single, overarching burnout factor.

Researchers have pointed out a lack of evidence regarding several job resources and demands related to the onset of or protection from burnout, such as empowering leadership, coworker support, work-home conflict, and interpersonal conflict at work (Bakker et al., 2023).

Empowering Leadership

For many decades, organizational structures were vertically constructed, with the official leader situated above the followers in a hierarchical order (Edelmann et al., 2020). Empowering leadership

describes a leadership style able to craft a supportive and inclusive work atmosphere and to foster an environment in which employees are encouraged to actively engage and take charge of their work (X. Zhang & Bartol, 2010). This leadership style is characterized by elements of trust, collaboration, and a focus on enriching the skills of team members, thus promoting employees' engagement, satisfaction, and performance (Cheong et al., 2019). In addition, the propensity for innovation and creativity is also reinforced by empowering leadership, as employees are encouraged to venture beyond conventional paradigms and take calculated risks. Overall, empowering leadership can effectively promote a productive work environment and increase employee engagement, satisfaction, and performance, reducing the risk of burnout onset (Ahearne et al., 2005). However, although the favorable impacts of empowered leadership on performance are well documented (Cougot et al., 2022), their consequences on burnout have received less attention, and the research on the issue is conflicting (Kim et al., 2018). On the one hand, empirical results indicate that empowering leaders act as a protective factor able to buffer emotional exhaustion (Bobbio et al., 2012; Greco et al., 2006), presumably by encouraging the development of resources available to employees to deal with job demands, such as social support and self-efficacy (Bharadwaja & Tripathi, 2020; Kim et al., 2018). However, studies examining specifically the association between empowering leadership and burnout are quite scant.

Moreover, empirical investigations have consistently supported the relationship between empowering leadership and coworker support. Leaders who encourage team empowerment create an environment that fosters open communication, trust, and collaboration (Druskat & Pescosolido, 2006). Such environments tend to encourage employees to support each other as they are inspired by leadership to take the initiative and share responsibility (Spence Laschinger et al., 2009).

Empowering leadership enhances team members' emotional climate and well-being, fostering collaboration, mutual respect, and open communication (Rudolph et al., 2022). However, research suggested that interpersonal conflict can be a stressor that may undermine the positive effects of empowering leadership on team members (De Clercq & Belausteguigoitia, 2022; Spânu et al., 2013) and how leaders manage conflicts, could significantly shape the team's emotional climate (Yin et al., 2022).

Furthermore, previous scholars have delved into the association between empowering leadership and work-life conflict. The findings of these investigations present a complex picture. Some indicate that empowering leadership may alleviate work-life conflict (Aanonsen, 2017; Helland et al., 2020), while others propose that this association may be tricky, contingent upon various factors (Nong et al., 2022; P. Zhang & Gheibi, 2015). A specific inquiry by P. Zhang and Gheibi (2015) posits that work engagement could mediate the relationship between empowering leadership and work-home conflict, suggesting that higher empowering leadership leads to positive work engagement and, in turn, increased work-home conflict.

Given the literature review and findings from previous studies, the following hypotheses were formulated:

- **H1**: Empowering leadership is negatively associated with the four main components of burnout (exhaustion, detachment, cognitive impairment, and emotional impairment).
- **H2**: Empowering leadership is positively associated with coworker support.
- **H3:** Empowering leadership is negatively associated with interpersonal conflicts at work.
- **H4:** Empowering leadership is negatively associated with work-home conflict.

Coworker Support

Previous studies have focused on the relationship between coworker support and different facets of workers' well-being, such as job satisfaction, family satisfaction, life stress, and employee mental health (e.g., Heaney et al., 1995; Stamper & Johlke, 2003). Furthermore, research suggests that coworker support might have a significant role in 'buffering' employees against burnout (Snyder,

2009). Although some scholars have attempted to study the relationship between organizational support and well-being (e.g., Gyu Park et al., 2017; Panaccio & Vandenberghe, 2009), such studies are still rare. Furthermore, to our knowledge, no studies investigated the relationship between empowering leadership, support, and different burnout outcomes.

While Salahian et al. (2012) showed that perceived coworker support moderated the relationship between stress and burnout, other authors suggested that perceived coworker support will mediate the relationship between empowering leadership and subjective well-being (Kim et al., 2018). We could also argue that coworker support may mediate the relationship between empowering leadership and burnout because supportive work environments help alleviate stress, distribute the workload more equitably, and enhance problem-solving abilities (Halbesleben, 2006). When leaders empower their employees, it strengthens bonds among employees and fosters a sense of collective competence and shared responsibility. This dynamic can reduce the likelihood of burnout by providing employees with the emotional, informational, and instrumental resources they need to cope with job demands (Bakker et al., 2005). In addition, coworker support also contributes to a sense of social support that has been shown to buffer the negative effects of stress and reduce the risk of burnout (Olson et al., 2019). Therefore, one could hypothesize that empowering leadership has an indirect effect on burnout through the mediator of coworker support. Given the lack of sufficient research on the relationship between employees' social relationships and the onset of burnout in the available literature, this paper identifies how empowering leadership influences employees' burnout onset.

H5: Coworker support mediates the relationship between empowering leadership and the four main components of burnout, wherein coworker support decreases burnout.

Interpersonal Conflict at Work

Several studies have highlighted that higher levels of interpersonal conflict in the workplace can lead to negative consequences such as lower intrinsic motivation and increased frustration, anger, anxiety, depressive symptoms, and burnout in workers (Demsky, 2012; Jasiński & Derbis, 2022; Shaukat et al., 2017). On the other hand, researchers have also indicated that such emotional and physical exhaustion (as burnout indicators) can cause workers to emotionally and cognitively distance themselves from their work and the people with whom they work (Bang & Reio, 2017). Consequently, these burned-out workers are more prone to initiate interpersonal conflict in the workplace, exhibit hostile behavior toward others, and display a lack of consideration (Geuens et al., 2015; Maslach et al., 2001). In summary, interpersonal conflict in the workplace can lead to burnout, and burnout can lead to interpersonal conflict in the workplace. This can set in motion a negative cycle that can be harmful to both the individual and the workplace.

The relationship between empowering leadership and workplace interpersonal conflict can be intricate and multifaceted. Previous authors showed that differentiated empowering leadership can positively buffer workplace interpersonal conflict and counterproductive work behavior (Kessler et al., 2013). This suggests that burn-out-related outcomes, which are associated with interpersonal conflict at work, can be modulated by the type and style of leadership in place, with empowering leadership typically yielding more positive outcomes. The research suggests that empowering leadership can positively impact team members' emotional climate and well-being, which may help reduce interpersonal conflict at work and, consequently, the onset of burnout.

H6: Interpersonal conflict at work mediates the relationship between empowering leadership and the four main components of burnout, whereby an increase in interpersonal conflict at work amplifies burnout levels.

Work-Home Conflict

Previous research has shown a positive correlation between home demands and workplace burnout (Lee & Eissenstat, 2018), highlighting the relevance of examining work-home conflict as a potential

antecedent of burnout. Given the prevalence of work-home conflict across professional roles and sectors, exploring the mechanisms underlying this relationship is critical to potentially identifying buffering factors and ultimately developing strategies to prevent and manage burnout. To this end, a valuable framework is the Work-Home Resources (W-HR) model (ten Brummelhuis & Bakker, 2012), suggesting that personal resources such as time, mood, and energy can mediate the relationship between work demands and resources and outcomes at home. Furthermore, the model proposes that the same personal resources can mediate the relationship between domestic demands and resources and work outcomes. Additionally, macro and critical resources, including organizational culture, welfare, and leadership, can moderate these spillover processes by influencing how individuals deal with work and personal demands and how they use their work and personal resources. Aw et al. (2021) found that employees who offered help and support to their colleagues felt a sense of personal accomplishment but also felt more fatigued (mainly when the help provided was unrequited). Consequently, these authors emphasized that exhaustion was associated with withdrawal behavior and lower family performance, whereas personal accomplishment was associated with lower withdrawal behavior and better family performance. Similarly, Du et al. (2020) found that positive events related to children on the previous day moderated the relationship between daily work demands and daily task performance and that a resource-rich family life (i.e., high levels of positive events related to children) moderated the worker's work demands and improved task performance on the following workday.

Cumulatively, the interplay between empowering leadership and work-life conflict is an active domain of scholarly exploration. The complexity of this relationship necessitates further investigation for comprehensive understanding.

H7: Work-Home conflict mediates the relationship between empowering leadership and the four main components of burnout, such that an increase in Work-Home conflict augments burnout levels.

Figure 1 depicts the hypothesized model.

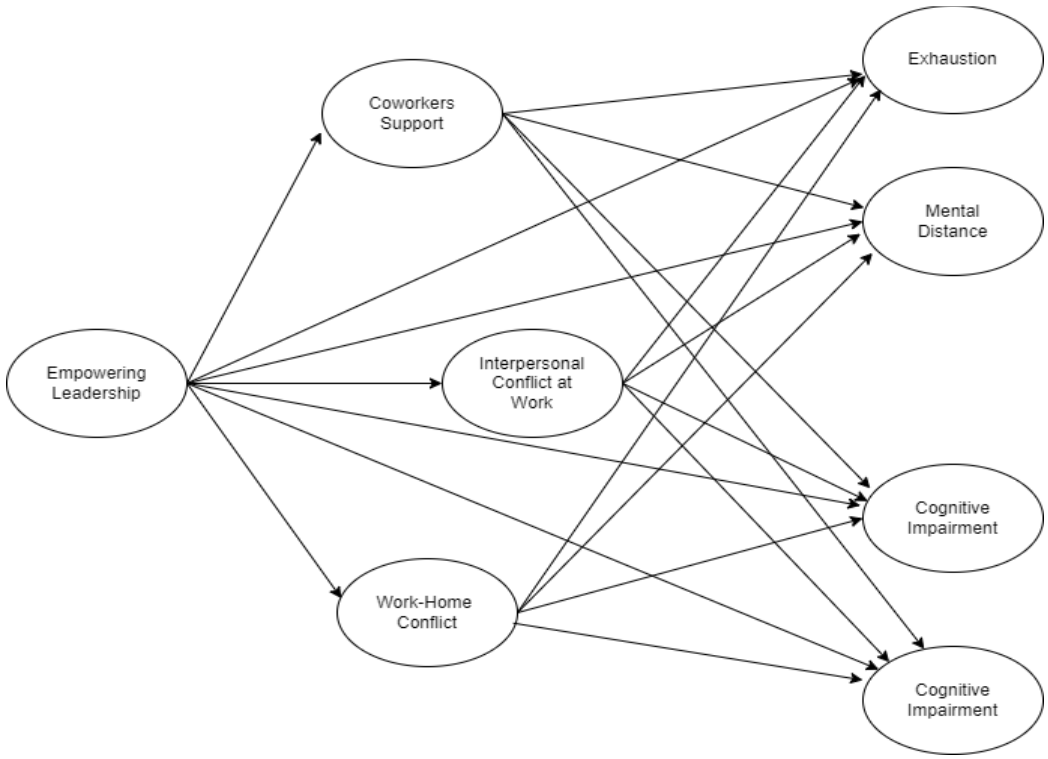

Figure 1. **The hypothesized model**

MATERIALS AND METHOD

PARTICIPANTS AND PROCEDURE

This study is part of a psychosocial risks assessment associated with work-related stress, as required by Italian law on health and safety at work (Law Decree 81/2008; Galantino & Basenghi, 2009). The research was carried out following the principles of the Helsinki Declaration, as well as the criteria for personal data handling outlined in the General Data Protection Regulation (GDPR) and Italian privacy legislation (Law Decree 196/2003 and Article 89 of EU REGULATION 2016/679; Biagi et al., 2005; Costantini, 2018). The Human Resources Department assisted in sending all workers an email reporting the link to an online survey they could complete. The letter additionally noted that participation in the study was entirely voluntary and that participants might withdraw at any moment without explanation and without incurring any loss or prejudice. Participants' consent was obtained by action by checking the consent checkbox as a requirement to access the questionnaire. A sample of 454 Italian employees from a social cooperative (72.9% female; *Mage* = 38.45, *SDage* = 10.15) filled out an online questionnaire. Among them, 50.47% held a permanent part-time contract, and 57% graduated. Regarding their job role, 25.3% were educators in youth communities, 24.9% were part of the administrative staff, 21.8% worked in disability/addiction communities, and 12.8% worked in childcare services.

MEASURES

Empowering Leadership was measured using the 6-item subdimension of participative decision-making, taken from the Empowering Leadership Questionnaire (Arnold et al., 2000). A sample item is: "My supervisor encourages work group members to express ideas/suggestions." Participants answered on a 5-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). This scale reported a Cronbach's alpha coefficient of 0.70.

Work-Home Conflict was assessed using the 3-item scale developed by Guglielmi et al. (2011). A sample item is: "I am so tired and stressed when I leave work that it is difficult for me to fulfill my home duties." Participants were asked to indicate on a 6-point Likert scale to what extent each statement applied to their situation, ranging from 1 (completely disagree) to 5 (completely agree). Cronbach's alpha value for this scale was equal to 0.81.

Interpersonal Conflict at Work was measured using the 6-item program management subscale from the Interpersonal Strain at Work Scale (Borgogni et al., 2012). A sample item is: "At work, I'm not particularly interested in what happens to others." All items were scored on a 5-point scale ranging from 1 (never) to 5 (daily). The internal consistency of this scale was 0.81.

Coworker Support was measured using 4 items developed by Kossek et al. (2009). A sample item is: "Coworkers give me the help and support I need." All items were scored on a 5-point scale ranging from 1 (never) to 5 (always). The internal consistency of this scale was 0.88.

Burnout was evaluated using the 12-item Italian version of the BAT (Hadžibajramović et al., 2022; Mazzetti et al., 2022). Each of the four main burnout symptoms was assessed using three items: exhaustion (example: "At work, I feel mentally exhausted"), mental distance (example: "I struggle to find any enthusiasm for my work"), cognitive impairment (example: "At work, I have trouble staying focused"), and emotional impairment (example: "At work, I feel unable to control my emotions"). Participants were asked to report how frequently they experienced the described symptoms using a 5-point Likert scale ranging from 1 (never) to 5 (always). All dimensions reported internal consistency coefficients ranging from 0.70 to 0.83.

Data Analysis

Data were checked for outliers, multicollinearity, and normality distribution using SPSS 28. Since the lowest tolerance statistic of 1.20 and the greatest variance inflation factor of 1.44 were both well below the suggested cut-off of 10, there was no evidence of multicollinearity. Skewness levels (ranging from -0.60 to 1.33) and kurtosis values (ranging from -0.46 to 3.12) were acceptable.

This study follows a complementary structural equation model (SEM) approach and a deep artificial neural network (ANN) approach to evaluate the predictive model. This approach is advantageous in enabling the investigation of non-linear and linear relationships with variables (Arpaci & Bahari, 2023; Ladstätter et al., 2016).

We used the Mplus 8 software (Muthén et al., 2017) to estimate a structural equation model (SEM). Using the maximum likelihood (ML) methodology, we first performed Confirmatory Factor Analysis (CFA). In order to evaluate goodness-of-fit, four fit indices are used: Chi-square (2), comparative fit index (CFI), Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA). A model fits the data well when CFI and TLI exceed at least 0.90 but preferably 0.95, and RMSEA is lower than or equal to 0.06 (Hu & Bentler, 1995).

The SEM approach helps determine the linearity of the relationships between endogenous (dependent) and exogenous (independent) variables. However, the deep ANN model helps to see the non-linearity of these relationships. ANN analysis is a quasi-exploratory technique composed of three distinct layers: input, hidden, and output (Hayat et al., 2021). The neurons in the input and output layers are interconnected via the concealed or hidden layer. This hidden layer operates similarly to the black-box model of human cognition (Hayat et al., 2021). The ANN analysis utilizes a non-compensatory diagnostic method incorporating a deep learning approach with the same three-layer configuration. The processed information in the ANN analysis is then partitioned into three sets: training, testing, and validation.

Results

Descriptive Statistics

Means, standard deviations, and correlations between the study variables are reported in Table 1. All significant relationships among variables were in the expected direction. Furthermore, as shown in Table 1, all scales reported an internal consistency value (Cronbach's alpha) exceeding the criterion of 0.70 (DeVellis & Thorpe, 2016).

Table 1. Descriptive statistics, Cronbach's alphas, and correlations

		1	2	3	4	5	6	7	8	9	10	11
1	Gender	--										
2	Age	-.13**	--									
3	Work contract	.02	-.44**	--								
4	Empowering leadership	.06	-.15**	.13**	(.70)							
5	Coworker support	.05	-.19**	.16**	.46**	(.88)						
6	Work-home conflict	.10*	-.02	-.16**	-.26**	-.23**	(.81)					
7	Interpersonal conflict at work	.11*	.15**	-.21**	-.31**	-.43**	.39**	(.81)				
8	BAT exhaustion	.08	.01	-.15**	-.24**	-.26**	.68**	.48**	(.83)			
9	BAT detachment	-.10*	.11*	-.15**	-.41**	-.35**	.39**	.59**	.44**	(.74)		
10	BAT cognitive impairment	-.02	.04	-.11*	-.20**	-.12**	.46**	.56**	.55**	.46**	(.74)	
11	BAT emotional impairment	.01	.00	-.07	-.22**	-.25**	.50**	.59**	.58**	.49**	.58**	(.72)

Note. SD= Standard Deviation; Gender: 0 = male; ** $p < .01$, ** $p < .05$.
Scale reliabilities (Cronbach's alpha) are in brackets along the diagonal.

Confirmatory Factor Analyses

We used maximum likelihood parameter estimation in Mplus 8.1. to perform a Confirmatory Factor Analysis (CFA) to assess the structural validity of our measures. Table 2 reports the results of comparisons between nine alternative models aimed to validate the measurement structure of the scale. In the first model (M1), all items were loaded on a general latent factor. The second model (M2) was a two-factor model with the empowering leadership items and all the remaining items loading on different factors. Next, we evaluated a third model (M3), assuming empowering leadership and BAT exhaustion loading in two different factors and the remaining items loading on a third factor. The fourth model (M4) contemplates four different factors: empowering leadership, BAT exhaustion, BAT mental distance, and all the remaining items. The fifth model (M5) comprised 5 different factors, namely empowering leadership, BAT exhaustion, BAT mental distance, BAT cognitive impairment, and all the remaining factors on the last factors. The sixth model contemplates six different factors: empowering leadership and all 4 different BAT dimensions on separate factors (exhaustion; mental distance; cognitive impairment; emotional impairment) and the remaining items on sixth factors. The seventh model (M7) covers empowering leadership, the four different BAT dimensions, coworker support, and another factor with the remaining factors. Our eighth model (M8) contemplates nine factors: empowering leadership; four BAT dimensions; coworkers support; work-home conflict; interpersonal conflict at work. Our last model (M9) added the modification indices indicated in the output. The obtained results suggest that the eight-factor model, including empowering leadership, interpersonal conflict at work, work-home conflict, coworkers support, exhaustion, mental distance, cognitive impairment, and emotional impairment, reported the best fit to our data when compared to competitive solutions ($\chi2(406) = 787.48$, $p = .000$, RMSEA = .05 SRMR = .05, CFI = .95, TLI = .93). This finding supports the discriminant validity of our measurements. Thus, the model fit was increased by allowing to correlate the error terms of two items of the BAT-12 mental distance sub-scale ("I feel a strong aversion towards my job" and "I struggle to find any enthusiasm for my work"), two items from the BAT-12 emotional impairment subscale ("At work, I feel unable to control my emotions" and "At work, I may overreact unintentionally"), two items from the BAT-12 exhaustion subscale ("At work, I feel mentally exhausted" and "At work, I feel physically exhausted"); two items from the interpersonal conflict at work scale ("At work, I'm not particularly interested in what happens to others" and "At work, I find myself to be insensitive to other people's problems."): $\chi2(402) = 702.829$, $p = .000$, RMSEA = .04, SRMR = .04, CFI = .96, TLI = .95.

Table 2. Fit indices for the four-factor model and the alternative models

Model	χ^2	*df*	*p*	RMSEA	SRMR	CFI	TLI
One-factor model (M1)	3586.94	434	.000	.13	.12	.53	.50
Two-factor model (M2)	34205.40	433	.000	.10	.10	.72	.70
Three-factor model (M3)	2175.78	431	.000	.09	.09	.74	.71
Four-factor model (M4)	2118.46	428	.000	.09	.09	.75	.72
Five-factor model (M5)	2011.46	424	.000	.09	.09	.76	.74
Six-factor model (M6)	1891.41	419	.000	.09	.09	.78	.75
Seven-factor model (M7)	1210.13	413	.000	.07	.88	.87	.06
Eight-factor model (M8)	787.48	406	.000	.05	.05	.95	.93
Eight-factor model (mod indices; M9)	**702.829**	**402**	**.000**	**.04**	**.04**	**.96**	**.95**

Note. df = degree of freedom; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residuals; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index. In bold is the selected model.

Mediation Analyses

The hypothesized model showed optimal goodness fit ($\chi2(432) = 888.659$, $p = 0.000$, RMSEA = .05, SRMR = .08, CFI = .93, TLI = .92). Regarding direct effect, the control variable work contract showed a non-significant association with exhaustion, mental distance, cognitive and emotional impairment. Our results partially support H1. In fact, empowering leadership showed a significant negative association only with the mental distance burnout dimension (β =-.14, S.E. = .49, p= .004). Results regarding empowering leadership did not reveal other significant direct associations with the other burnout dimensions. On the other hand, empowering leadership showed a positive association with coworker support (H2; β = .44, S.E. = .05, p = .000) and a negative association with interpersonal conflict at work (H3; β = -.23, S.E. = .04, p= .000) work-home conflict (H4; β = -.30, S.E. = .05, p= .000). Figure 2 illustrates the hypothesized model and effect sizes.

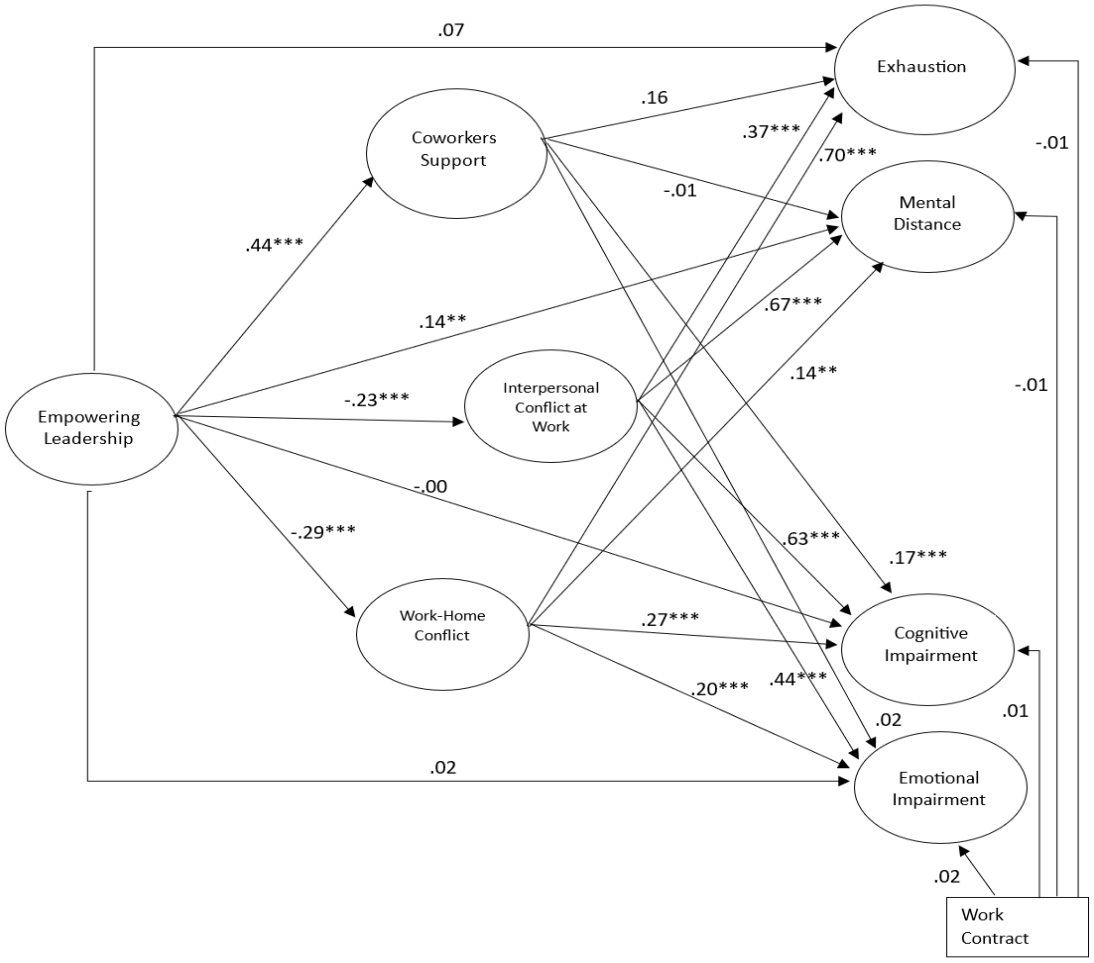

Figure 2. Mediation model and effects

Concerning the hypothesized mediation, the indirect association between empowering leadership and exhaustion was confirmed when interpersonal conflict at work (β = -.11, S.E. = .03, p = .000) or work-home conflict (β = -.26, S.E. = .05, p = .000) act as mediator. Indeed, we did not confirm the indirect association between empowering leadership and exhaustion via social support. Regarding the indirect association between empowering leadership and mental distance, it was confirmed only when interpersonal conflict at work (β = -.28, S.E. = .05, p = .000) or work-home conflict work (β = -.11, S.E. = .03, p = .009) act as mediator. Again, we did not confirm the indirect association between empowering leadership and mental distance via coworker support. Regarding the indirect effect between empowering leadership and cognitive impairment, we confirmed it when coworkers support work (β

= .13, S.E. = .04, p = .000), interpersonal conflict at work (β = -.26, S.E. = .05, p = .000) and Work-Home conflict work (β = -.13, S.E. = .03, p = .000) act as mediator. Finally, for the indirect association between empowering leadership and emotional impairment, we confirm our mediation hypothesis of interpersonal conflict at work (β = -.27, S.E. = .05, p = .000) and Work-Home conflict (β = -.16, S.E. = .03, p = .000), but not of coworker support. These results provided partial support to our hypotheses.

Table 3. Standardized indirect effects for mediation models

Standardized direct and indirect effects			
Effects-Hypothesized Model	Estimate	*S.E.*	*95% CI*
Empowering leadership → exhaustion			
Empowering leadership → coworker support → exhaustion	-.01	.03	[-.06, .04]
Empowering leadership → interpersonal conflict at work → exhaustion	-.12***	.03	[-.17, -.06]
Empowering leadership → work-home conflict → exhaustion	-.25***	.05	[-.34, -.17]
Total effect	-.28***	.06	[-.40, -.16]
Total indirect	-.36***	.06	[-.50, -.26]
Empowering leadership → mental distance			
Empowering leadership → coworker support → mental distance	-.007	.04	[-.09, .08]
Empowering leadership → interpersonal conflict at work → mental distance	-.28***	.05	[-.38, -.18]
Empowering leadership → work-home conflict → mental distance	-.07**	.03	[-.13, -.02]
Total effect	-.61***	.07	[-.74, -.48]
Total indirect effect	-.36***	.07	[-.50, -.21]
Empowering leadership → emotional impairment			
Empowering leadership → coworker support → cognitive impairment	.13***	.04	[.60, .20]
Empowering leadership → interpersonal conflict at work → cognitive impairment	-.26***	.05	[-.35, -.17]
Empowering leadership → work-home conflict → cognitive impairment	-.14***	.03	[-.20, -.07]
Total effect	-.27***	.06	[-.39, -.15]
Total effect indirect	-27***	.07	[-.40, -.14]
Empowering leadership → cognitive impairment			
Empowering leadership → coworker support → emotional impairment	.02	.03	[-.04, .08]
Empowering leadership → interpersonal conflict at work → emotional impairment	-.27***	.05	[-.37, -.18]
Empowering leadership → work-home conflict → emotional impairment	-.16***	.03	[-.23, -.09]
Total effect	-.36***	.07	[-.50, -.25]
Total indirect effect	-.41***	.07	[-.54, -.30]

Note. ** $p < .01$; *** $p < .001$; S.E. = Standard Errors; 95%
CI = bootstrapping lower and upper limit bias-corrected; 95% confidence intervals

Deep ANN Model

The Artificial Neural Network (ANN) analysis for this investigation was conducted using SPSS 26. The ANN model utilized a Multilayer Perceptron (MLP) training method. The selection of one hidden layer was based on the argument by Sharma et al. (2018) that a single hidden layer is sufficient to represent a continuous function adequately. A ten-fold cross-validation technique was implemented (Talukder et al., 2020) to address the overfitting issue commonly encountered in neural network analyses.

In terms of data allocation, 70% of the data was employed to train the ANN model, leaving the remaining 30% to test the model's prediction accuracy. The hidden layer activation function employed was a hyperbolic tangent that can model complex relationships, while the output layer used the identity function, providing unbounded raw outputs. The model was developed to predict four burnout symptoms (exhaustion, mental distance, cognitive impairment, and emotional impairment) using four predictor variables (empowering leadership, coworker support, interpersonal conflicts at work, and work-home conflict).

The ANN model achieved a remarkable average prediction accuracy of 99.4% and 99.5% during the training and testing stages. It is important to note that the 'relative error', defined as the variance of the Sum of Squares, was kept under the typical threshold of 10%, indicating that the Sum of Squares for Error (SSE) should not surpass 10% of the total sum of squares. Table 4 ranks the predictor variables in terms of their importance. Interpersonal conflict at work emerges as the most significant construct in our model.

Table 4. Independent variable importance

Rank	Constructs	Importance	Normalized Importance
1	Interpersonal Conflict at Work	.479	100.0%
2	Work-Home Conflict	.319	66.5%
3	Empowering Leadership	.123	25.8%
4	Coworker support	.079	16.5%

Figure 3 shows the ANN model results, displaying the synaptic weights of the relationships between variables in the model. Synaptic weight refers to the strength or amplitude of a connection between two nodes (or neurons), a key component of how ANNs learn from data. The right column in Figure 3 represents the model's input layer, the center column represents the hidden layer, and the left column represents the output layer. The ovals in the center column represent neurons in the hidden layer of the ANN. The number of these neurons can be determined based on the complexity of the data and the problem at hand. The Distortion cells refers to the manner in which data is transformed, modified, or "distorted" during its passage through the hidden layers of the network. It measures the quality of the mapping from the input layer to the hidden layer(s) and then to the output layer. One of the primary characteristics of ANNs is their ability to perform non-linear transformations of the input data. These transformations can be seen as "distortions" as they change the way the data is represented, allowing the network to model complex, non-linear relationships that a simple linear model could not.

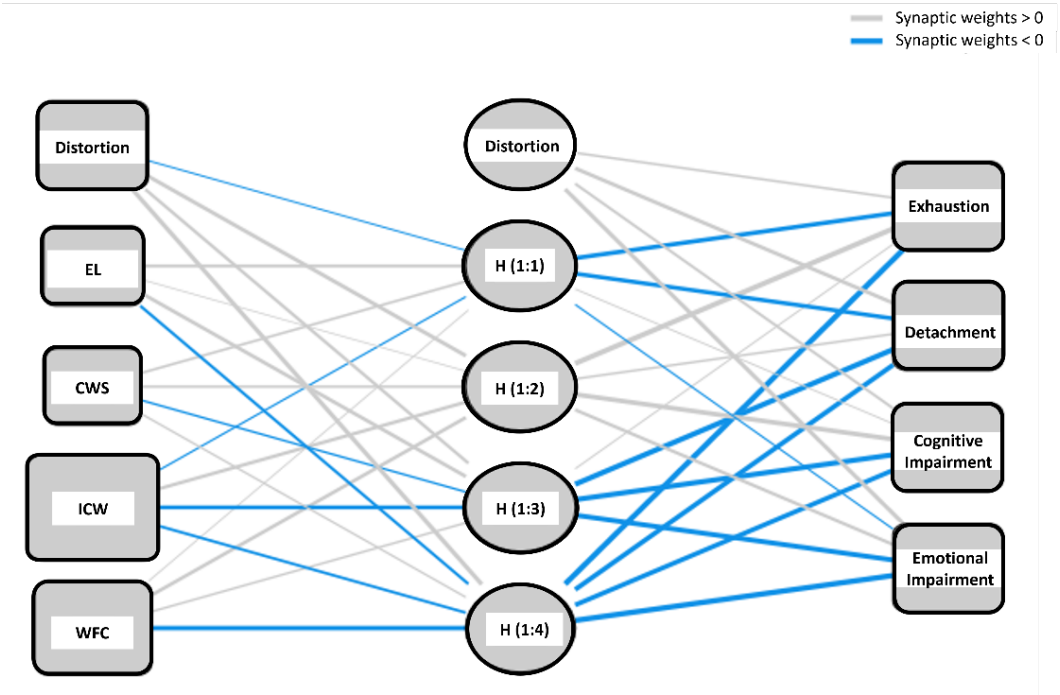

Figure 3. ANN model results

Notes: EL= Empowering Leadership; CWS= Coworker Support; ICW= Interpersonal Conflict at Work; WFC= Work-Home Conflict; H= Hidden Layer

DISCUSSION

We aimed at extending the body of research on the factors contributing to the emergence of burnout symptoms. We explored the relationship between empowering leadership and the four dimensions of burnout (i.e., exhaustion, mental distance, cognitive impairment, and emotional impairment) while also taking into account the potential mediating effects of workplace interpersonal conflict, work-home conflict, and coworker support. To do so, we used a combined approach of structural equation modeling (SEM) and artificial neural network (ANN) analysis. The analysis of the proposed model revealed a satisfactory goodness of fit, pointing to the model's structural validity. Our results partially confirmed our hypotheses. Specifically, we identified a direct association between empowering leadership and the "mental distance" dimension of burnout, but not among the other dimensions. In addition, we confirmed direct associations between empowering leadership and our mediating variables, namely worker support, interpersonal conflict, and work-family conflict. With respect to the hypothesized indirect effects, the results partially confirmed our hypotheses, showing that the association between empowering leadership and the dimensions of burnout is mediated by interpersonal conflict at work and work-family conflict. As for the mediating role of peer support, the latter only mediates the association between empowering leadership and the cognitive impairment dimension, showing no significant effect in the relationships with the other burnout variables. The ANN results complement our findings by showing that interpersonal conflict at work is the most significant predictor in our model, followed by work-family conflict. Although coworker support was the least strong predictor in the model, this result should not lead researchers to underestimate its role.

THEORETICAL CONTRIBUTION

With respect to H1 (i.e., the negative association of empowering leadership with the four components of burnout), empowering leadership exhibited a significant negative association solely with mental distance, suggesting that effective empowering leadership can potentially mitigate feelings of

detachment in employees. In line with previous findings concerning transformational leadership, as the "gold standard" of positive leadership styles, we can argue that also empowering leadership, might affect followers' motivation - i.e., reduced depersonalization - more significantly than their level of energy-reduced emotional exhaustion (Hetland et al., 2007). Moreover, in contrast to previous findings, no substantial direct effects were found on the other dimensions of burnout. For example, research conducted by Mudallal et al. (2017) on a Jordan nurse sample found that nurses' emotions of depersonalization and emotional exhaustion were exacerbated by empowered leadership, as well as their perception of personal success. These findings suggest that nurses' sentiments of empowerment will lessen their burnout experiences. In our study, empowering leadership by delegating responsibility and autonomy in decision-making allows workers to feel more involved and motivated in their work, reducing mental distance, but it does not directly affect the other dimensions. The type of work contract used as a control variable did not show any significant relationship with any burnout dimensions. This implies that regardless of the type of work contract, the risk and severity of burnout do not significantly vary, necessitating a focus on other antecedents in managing burnout.

Interestingly, empowering leadership demonstrated a substantial positive association with coworker support (H2) and a significant negative association with interpersonal conflict at work (H3) and work-home conflict (H4). Results are in line with previous studies. Regarding coworkers' support, previous research showed that since authority is a core premise of empowering leadership, and duties may be shared, leaders who show empowering leadership behaviors may build a cooperative atmosphere in their teams (Kim et al., 2018). Empowering leadership, for example, frequently encourages subordinates to collaborate with coworkers and seek opportunities to learn and improve (Pearce & Sims, 2002). Employees are encouraged to support one another by giving them authority and addressing difficulties cooperatively (Srivastava et al., 2006). Employees may be more inclined to help and cooperate with their coworkers when they believe leaders collectively empower them. Actually, empowered leaders foster a cooperative climate and encourage them to solve existing problems by collaborating with others, which increases employees' feelings of being supported.

Regarding the association with work-home conflict, the scientific literature results are mixed. For example, a study by Boamah et al. (2022) shows that an authentic leadership style, which promotes the creation of a supportive work climate, can reduce the perception of work-home conflict. In contrast, a study by Mudallal et al. (2017) shows that in the long run, an empowering leadership style, by increasing workers' autonomy and responsibilities, also intensifies workload and tasks, subsequently affecting work-personal task conflict as well. Furthermore, previous research has shown that differentiated empowered leadership can help to buffer workplace interpersonal conflict and counterproductive job behavior (Kessler et al., 2013). Overall, this finding underscores the crucial role of an empowering leader in fostering a supportive work environment and reducing work-related stressors.

Regarding the indirect effect, we partially confirmed our hypotheses. We cannot confirm the mediator role of coworker support (H5), except in the association between empowering leadership and cognitive impairment. In contrast, we confirmed the mediator role of interpersonal conflict at work (H6) and work-home conflict (H7) in the association between empowering leadership with each burnout dimension.

In general, empowering leadership enhances the likelihood of perceiving coworker support, which, in turn, may reduce burnout levels. In a systematic review conducted regarding nurse burnout by Wei et al. (2020), one of the findings is that leadership plays an important role in improving a healthy work environment, including positive relationships among all workers, and is correlated with a reduction in nurse burnout. Probably in the context of our study, perceived support from colleagues is insufficient to reinforce the effect of empowering leadership on burnout dimensions. However, empowering leadership, precisely because of its characteristics, can facilitate collaboration among its followers, which also influences how they work by promoting the enactment of supportive behaviors toward coworkers, which helps workers stay more focused, decreasing distractions and errors, and reducing cognitive impairment.

Concerning workplace interpersonal conflict, we confirm the mediator role in the association between empowering leadership and burnout dimensions. Previous findings support our results. For example, nurse leaders are responsible for developing a work climate that promotes respectful interpersonal interactions and teamwork (Wei et al., 2020). In general, relational leadership styles can assist nurse leaders in focusing on interpersonal connections and fostering a healthy work environment, which is linked to a lower degree of reported burnout.

The presented results partially supported our hypotheses, indicating a complex interplay of variables impacting burnout. Specifically, taken together, our results underscore the importance of promoting the empowering leadership style in light of its effect of increasing the perception of job support and decreasing the perception of interpersonal conflict at work and work-home conflict, which in turn go a long way toward decreasing the likelihood of developing burnout.

Results from ANN complement our primary findings and lend a quantitative weight to our discussion. The model displayed a high degree of predictive accuracy in its training (99.4%) and testing (99.5%) stages, reflecting the appropriateness of our chosen predictors in delineating the four burnout symptoms. Interestingly, the ANN model underscored the prominence of interpersonal conflict at work as the most relevant predictor in our model, echoing previous studies linking work conflicts to stress and subsequently to burnout (Edú-Valsania et al., 2022; Spânu et al., 2013). This finding punctuates the necessity of addressing interpersonal issues in the workplace to prevent the onset of burnout or at least mitigate its symptoms. In addition, work-home conflict was identified as the second most significant determinant. This finding echoes a study by Maslach and Leiter (2016), in which they suggest that one way to prevent burnout is to promote work-life balance, for instance, by encouraging employees to engage in activities outside of work that are personally meaningful and fulfilling. Although empowering leadership and coworker support were ranked lower in terms of importance, it is crucial not to overlook their effect. Drawing from the classic theory of social support, and more recent evidence on empowering leadership (Spânu et al., 2013), these factors serve as safeguards against burnout, potentially influencing the dynamics more indirectly or more complexly, as indicated in our mediation analysis.

Limitations & Future Directions

The study is not without limitations. First, the study design is cross-sectional and does not allow for evidence of causal relationships between variables. Second, the sample is not representative, as it consists of workers from only one cooperative in north-central Italy. Lastly, measures used are self-report.

To overcome these limitations, future research could use longitudinal research designs to assess the long-term effect of leadership style on the dimensions of burnout. It might be interesting to expand the sample to different types of workers to see the different effects of leadership on burnout. Moreover, it might be interesting to add, for example, conflict and support, hetero-directed assessments, to complete the picture of the influence of these variables on the experience of burnout.

Practical Implication

The paper emphasizes the influence of empowering leadership in reducing directly or indirectly, the experience of burnout. Leadership showed a direct positive association with perceived support from colleagues and a direct negative association with interpersonal conflict at work and work-family conflict. This suggests the importance of providing training courses for managers with respect to the relevance of adopting an appropriate leadership style that empowers workers to develop their personal resources.

Moreover, our results indicate the role of interpersonal conflicts and work-family conflict as critical factors in the development of burnout. This highlights the importance of scheduling times for discussion and training with respect to how to effectively manage conflict, as well as thinking about

corporate strategies to reduce the risk of experiencing a poor work-life balance. Finally, although the mediating role of peer support in the association between leadership and burnout was not confirmed, the results confirmed the direct effect of support in decreasing burnout in workers. This reiterates the importance of informing leaders and workers about the relevance of relationships among colleagues, thus designing moments of socialization among them or promoting effective ways of communication and collaboration.

CONCLUSIONS

The study adds to our understanding of the factors that influence burnout in the workplace by demonstrating the importance of empowering leadership, interpersonal conflict at work, work-home conflict, and coworker support as factors to consider for interventions aimed at reducing burnout and promoting organizational well-being. The use of SEM and ANN analysis solidifies the relationships proposed within our model, yet it also signals the need for more multifaceted interventions to address burnout. The study's findings accentuate the importance of investigating these varying influences on design comprehensive, effective interventions against burnout.

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