Basic Psychological Needs at Work and Employee Well-Being: A Longitudinal Multilevel Study of the Main and Moderating Effects of Psychosocial Safety Climate

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ABSTRACT

To create a more humane and sustainable workplace that upholds humanistic values alongside economic goals, it is critical to understand how organizations can effectively support employee well-being. Integrating self-determination theory within the psychosocial safety climate (PSC) framework, this study investigates (a) the core mechanism by which PSC supports employee well-being through basic psychological needs and (b) the organizational contexts in which this mechanism operates most effectively. Using a multilevel, cross-lagged panel model with three waves of data from 983 employees across 59 organizations, we decomposed PSC into between- and within-organization components. We investigated (a) within-organization mediation pathways, with need satisfaction and frustration mediating the relationships between individual PSC and work engagement and emotional exhaustion, respectively, and (b) between-organization contextual influences, testing how organizational-level PSC (i.e., PSC level and its interaction with PSC strength) moderates these indirect pathways. At the within-organization level, PSC was positively and indirectly related to work engagement through need satisfaction, and negatively and indirectly related to emotional exhaustion via need frustration. At the between-organization level, PSC level and its interaction with PSC strength significantly moderated these relationships. Particularly, higher organizational PSC levels amplified the positive indirect relationship between individual PSC and work engagement, whereas the negative indirect relationship between individual PSC and emotional exhaustion was strongest in organizations characterized by both lower PSC levels and higher PSC strength. This study illustrates the multilevel role of PSC in promoting and sustaining employee well-being by supporting their inherent human tendencies toward psychological need fulfillment.

Keywords: psychosocial safety climate, need satisfaction, need frustration, self-determination theory, employee well-being

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Organizational sustainability cannot be achieved without sustaining the human capital that drives it (Pfeffer, 2010). Employee well-being is both fundamental to, and a key indicator of, the sustainability of the workforce and, by extension, long-term organizational success (Barnes et al., 2023). When well-being deteriorates, employees' capacity to perform and contribute effectively declines, triggering a vicious cycle of reduced productivity, increased turnover, and higher sickness absence—all of which jeopardize organizational sustainability (International Labour Organization, 2016). More importantly, fostering humane, sustainable workplaces is crucial not solely for its impact on costs and productivity but because employee well-being is an ultimate goal in its own right (United Nations General Assembly, 1948). Accordingly, research that draws attention to human needs and how work environments can enhance and sustain employee well-being responds directly to the United Nations Sustainable Development Goals' call to action, particularly amid the global mental health crisis (United Nations General Assembly, 2015; World Health Organization, 2022).

Among studies focusing on employee well-being, factors such as leadership practices (Inceoglu et al., 2018), human resource strategies (Guest, 2017), and organizational climate (Loh et al., 2018) have emerged as influential contributors. Although the first two have provided valuable insights into employee well-being, organizational climate captures a more comprehensive representation of the work environment, encompassing but extending beyond leadership styles and human resource practices to include a wider array of organizational features that collectively shape the workplace (Beus et al., 2023; Schneider et al., 2017). In this research, we investigate how psychosocial safety climate (PSC)—defined as shared employee perceptions regarding "policies, practices and procedures for the protection of worker psychological health and safety" (Dollard & Bakker, 2010, p. 579)—promotes

employee well-being. Unlike climates centered around productivity imperatives, PSC reflects a humanistic work environment that prioritizes and commits to employees' psychological well-being, encourages open communication and feedback channels, and actively involves members at all organizational levels in addressing and managing psychosocial risks.

Given its humanistic emphasis, PSC has consistently been linked to various well-being indicators, such as higher work engagement, lower emotional exhaustion, and reduced psychological distress (for a review, see Zadow et al., 2019). These associations are often theorized through the job demands–resources (JD–R) model, wherein PSC is conceptualized as an antecedent of job conditions and promotes employee well-being via two distinct pathways: (a) mitigating the health-impairment pathway by reducing job demands (e.g., emotional demands, workload), thereby protecting employees from ill-being; and (b) catalyzing the motivational pathway by increasing job resources (e.g., job control, learning opportunities), thereby promoting engagement at work. Despite mounting evidence supporting the potential benefits of PSC on well-being, three problems remain with the current state of PSC research, which we seek to address here. First, the psychological mechanisms through which PSC drives well-being remain underexplored, as the existing theoretical framework, namely the JD–R model, has been criticized for falling short of explaining the underlying psychological mechanisms involved (Bakker & Demerouti, 2017; Schaufeli & Taris, 2014). It would thus appear that the positive effects of PSC on employee well-being are not due to changes in job demands and resources per se, but rather stem from its ability to create and shape a work environment that supports or frustrates employees' innate psychological needs (Deci et al., 2017; Ryan et al., 2022). Drawing on self-determination theory (SDT), we argue that the fulfillment or frustration of three basic psychological needs—autonomy (i.e., feeling volitional and self-endorsed), competence (i.e., feeling effective), and relatedness (i.e., feeling significant and connected)—plays a more

proximal role in shaping employee well-being than job demands and resources (Deci & Ryan, 2000; Ryan & Deci, 2017, Chapter 10).

Second, PSC is a multilevel construct yet previous research has often relied on single-level analysis that treats PSC as an individual-level concept (e.g., Huyghebaert, Gillet, Fernet, et al., 2018; Huyghebaert, Gillet, Lahiani, et al., 2018) or used multilevel modeling that conflates within- and between-group effects, assuming that these levels yield identical effects (e.g., Idris et al., 2015; Yulita et al., 2022). Given the fundamental differences between individual and organizational climates (Beus et al., 2023; Kozlowski & Klein, 2000; Schneider et al., 2002), the effects of within- and between-group PSC on employee well-being are likely to differ. Differentiating between individual- and group-level PSC effects is theoretically important because doing so helps avoid drawing erroneous conclusions, such as inferring individual-level relationships from group-level findings, or vice versa (Kozlowski & Klein, 2000). To address this limitation, we examine the respective influences of group-level PSC (shared perception) and interindividual variability in PSC perceptions (individual perception) on employee well-being.

Third, and in a related vein, while a vast body of literature in organizational climate highlights the importance of climate strength—a group-level construct that specifically addresses the "within-unit variability on agreement [concerning climate perceptions]" (González-Romá & Hernández, 2014, p. 1044)—it is paradoxical that the variability in PSC perceptions has largely been overlooked or dismissed as error, with few exceptions (e.g., Afsharian et al., 2018, 2023). In the limited research considering PSC strength, studies have largely drawn on the JD–R model to examine interactions between climate level (specifically at the group level; i.e., the degree or extent to which a climate facet is manifested within a group; González-Romá & Hernández, 2014) and climate strength (e.g., Afsharian et al., 2018, 2023). However, as noted above, the JD–R model has been critiqued for its limited

explanatory power regarding psychological processes. We posit that investigating the interactions between PSC level and strength through the lens of SDT may yield novel insights, offering a deeper understanding of how PSC influences well-being.

In summary, we theorize and test a novel, comprehensive multilevel process model (see Figure 1) teasing out individual- and organizational-level processes: (a) individual-level mediated paths linking individual PSC to work engagement (i.e., a motivational state characterized by high energy, enthusiasm, and joyful involvement at work; Schaufeli et al., 2006) and emotional exhaustion (i.e., a strain state marked by low energy and being emotionally drained; Maslach & Leiter, 2016) via the satisfaction and frustration of employees' basic psychological needs, respectively; and (b) cross-level interactions, where between-organization PSC (i.e., PSC level and its interaction with PSC strength) provides an important context for the hypothesized individual-level mediated paths. We use work engagement and emotional exhaustion to capture employee well-being (or lack thereof) as they are recognized as key intervening psychological states that act as early markers of well-being (Bakker et al., 2023), allowing us to investigate the immediate effects of need-based experiences on employee wellness more effectively than distal well-being measures.

This study advances our knowledge of the relation between PSC and employee well-being in at least three ways. First, by incorporating SDT as a theoretical line of thought to investigate the mediating roles of basic psychological needs, we move beyond the traditional focus on job demands and resources to examine the fundamental psychological processes that drive the PSC–well-being relation. From this perspective, PSC operates as a contextual resource that supplies the essential psychological nutriments (i.e., autonomy, competence, and relatedness) needed for well-being. This theoretical refinement is crucial because basic psychological needs are more proximally linked to well-being than job demands and resources, thereby offering a more precise, human-centered explanation of why PSC

influences well-being. Second, we extend research on the mediating effect of need satisfaction (the "bright" pathway) by also considering need frustration (the "dark" pathway), because previous research shows that need frustration is not merely the opposite end of the same continuum as need satisfaction but rather represents a qualitatively different experience with unique impacts on human functioning (Van den Broeck et al., 2016; Vansteenkiste et al., 2020). Examining both need experiences expands our understanding of whether the beneficial effects of PSC extend beyond merely satisfying basic psychological needs to actively protecting employees from need frustration. Third, we contribute to a more comprehensive understanding of the multilevel nature of PSC by explicitly disentangling its within- and between-group (i.e., mean and variance) components and examining their cross-level effects. While prior research conceptualizes PSC as either an individual- or a group-level construct (e.g., Huyghebaert, Gillet, Fernet, et al., 2018; Idris et al., 2015), our multilevel model refines this conceptualization by showing that even when a specific within-group agreement criterion is met, organizations can exhibit theoretically meaningful within-group (individual PSC) and between-group (PSC strength) variances in perceptions of PSC (Beus et al., 2023). This multilevel investigation also extends broader climate research by revealing how individual- and group-level forms of climate may interact to influence critical outcomes. In doing so, it contributes not only to greater theoretical precision regarding the multilevel conceptualization of PSC but also to practical insights into how PSC functions distinctly across organizational levels, thereby providing a more comprehensive account of its role within organizations and informing how organization-wide and individualized PSC interventions can be strategically aligned for maximum effectiveness.

Theory and Hypotheses

A Multilevel Conceptualization of PSC

PSC reflects the humanity of the organization, revealing how deeply management values and prioritizes employee well-being (Dollard & Bakker, 2010). At first glance, PSC may appear similar to perceived organizational support (POS; Rhoades & Eisenberger, 2002), particularly regarding their focus on employee well-being; however, they differ conceptually. Firstly, the concepts differ in the nature of the perception they refer to. POS captures employees' beliefs about the organization's general commitment to them through the personification of their organization (Rhoades & Eisenberger, 2002). In contrast, PSC captures employees' beliefs about the organization's specific commitment to their psychological health and well-being, above and beyond productivity (Hall et al., 2010). Secondly, the two constructs differ in their theoretical foundations. POS is rooted primarily in social exchange theories, highlighting how employees perceive organizational support as a reciprocal exchange in which both employees and employers seek mutual benefit (Rhoades & Eisenberger, 2002). In contrast, PSC is grounded in psychological and organizational climate theories, representing a gestalt phenomenon shaped by various organizational elements (e.g., managerial behaviors, reward systems, daily work events) that define shared norms and expectations regarding organizational priorities (Schneider et al., 2017). Empirical evidence further supports the distinctiveness of PSC from POS (Idris et al., 2012; Yu et al., 2022).

Although climate is often conceptualized as a group-level phenomenon, it fundamentally originates from employees' individual appraisals (Beus et al., 2023). Thus, we begin with the often-overlooked individual-level construct of PSC[1], which captures each employee's individualized views on PSC within their organization (James et al., 2008).

[1] We use the terms "within-organization" and "individual" PSC interchangeably to denote individual perceptions of PSC.

Notably, individual PSC can vary within the same organization, with some employees perceiving PSC as more or less favorable than the group average. Such variability highlights that individual PSC reflects employees' idiosyncratic work experiences, which likely influence their internal psychological processes. Employees rely on their individual PSC as an interpretive lens through which they evaluate the extent to which their work environment supports or hinders their fundamental psychological needs. Since both need satisfaction and need frustration are experienced within their own psychological realms (Ryan & Deci, 2017, Chapter 10), individual PSC is uniquely positioned to directly influence these need-based experiences; therefore, the mediating processes linking PSC to employee well-being via basic psychological needs are likely to operate at the individual level.

Given the complexity of the work environment, employees make sense of their experiences based not only on their own cognitions but also on shared organizational norms and expectations (Beus et al., 2023). Thus, we contend that organizational PSC level[2] (i.e., the mean PSC score derived from aggregating individual responses at the organizational level) likely operates as a key social contextual moderator in the individual PSC–well-being relation, with different climate levels reflecting varying degrees of a supportive organizational environment in which individual experiences are interpreted (Loh et al., 2018). This broader context sets the tone for employees' interpretations of their personal experiences, guiding how they act on their individual perceptions and subsequently affecting their need-based experiences and well-being (Deci et al., 2017).

Acknowledging the inherent variability in climate perceptions within groups (e.g., Afsharian et al., 2018; Bowen & Ostroff, 2004), any scholarly inquiry into how PSC operates in organizational settings would prove incomplete without scrutinizing PSC strength.

[2] We use the terms "organizational" and "group" interchangeably, with our primary focus on the organization as the collective of interest in our theoretical framework.

Whereas group PSC level represents the overall favorability of the climate, PSC strength (i.e., individual PSC responses are compiled to calculate a standard deviation [SD] climate score for each organization; Krasikova & LeBreton, 2019) refers to the extent to which these climate perceptions are shared within the group, resulting in stronger (higher agreement) or weaker (lower agreement) climates. However, the level of agreement by itself lacks contextual meaning; it must be considered alongside the overall PSC level to understand what employees are agreeing on. Strong agreement, for instance, can indicate either a strong, positive or a strong, negative climate, depending on whether employees perceive the PSC as higher or lower; each has different implications (Bowen & Ostroff, 2004; Schneider et al., 2002). Therefore, the interaction between climate level and strength provides more meaningful information than the average alone, as weaker or stronger climates, combined with varying group PSC levels, send different signals about management's commitment to employee well-being, exerting differential effects on individual-level relationships. In summary, our multilevel conceptualization of PSC aligns with the logic of cross-level interactions. While individual PSC directly serves as an antecedent to need-based experiences and subsequently influences employees' motivational and strain-related states, between-organization PSC, specifically the overall PSC level and its interaction with PSC strength, establishes a broader context that moderates these individual-level relationships.

PSC and Employee Well-being: A Self-Determination Theory Approach

We draw on SDT to explain (a) how individual PSC influences employee well-being through need-based processes and (b) how the broader organizational PSC moderates these intrapersonal pathways. SDT, grounded in an organismic perspective, posits that humans, as living open systems, actively interact with their environment in a manner that realizes their inherent drive for growth and well-being through the satisfaction of three basic psychological needs: autonomy, competence, and relatedness (Ryan & Deci, 2017, Chapter 2). At the same

time, SDT emphasizes that these innate organismic propensities can be disrupted by social conditions that thwart the basic psychological needs, thus distinguishing between need satisfaction and need frustration, two experiences that are not necessarily symmetrical (see Vansteenkiste et al., 2020). The essential role of these needs manifests through two distinct pathways: (a) a bright pathway, in which need satisfaction nourishes employees by providing essential psychological nutrients that energize them and fuel positive functioning and (b) a dark pathway, in which need frustration depletes energy and leads to diminished functioning (Ryan & Deci, 2017, Chapter 10). This study, therefore, investigates the mediating roles of need satisfaction and need frustration as explanatory mechanisms through which the work context creates need-supportive or need-thwarting conditions, subsequently predicting variations in employee well-being. The humanistic orientation of PSC naturally aligns with SDT's focus on cultivating well-being and preventing ill-being (Deci et al., 2017) and thus supports the selection of both individual PSC as a direct antecedent of need-based experiences and group-level forms of PSC as broader contextual factors that moderate these psychological processes. We focus on work engagement and emotional exhaustion as downstream outcomes because they reflect the energizing and energy-depleting effects of need satisfaction and need frustration, respectively.

The Mediating Roles of Basic Psychological Need Satisfaction and Frustration: Within-Organization Mechanism

PSC, Need Satisfaction, and Work Engagement: The Bright Pathway

The bright pathway is conceived as the relationship between PSC and work engagement via satisfaction of the three basic needs. The adoption of participative practices—a key principle of PSC in which employees are given the chance to ask for help, be open about their psychological well-being, and be included in the process of creating a psychologically healthy workplace—should instill a greater sense of inclusion among the

employees. There should consequently be a strong positive relationship between PSC and the satisfaction of the need for relatedness. Furthermore, the principles of two-way communication and participation, implemented as part of the PSC practices, suggest that managers listen to and value the ideas and perspectives of employees. Managers offer opportunities for employees to make choices and provide input concerning the psychosocial aspects of their work environment. In such a climate, communication from management is likely to be perceived by employees as informational rather than controlling; that is, feedback from managers is regarded as valuable information for decision-making and idea exploration, rather than as commands pressuring employees into compliance with the managers' agenda (Deci et al., 2017). Therefore, higher PSC is associated with more self-directed and autonomous behavior among employees (e.g., Hu et al., 2022; Loh et al., 2018), fulfilling their need for autonomy. Moreover, PSC principles inherently nurture employees' need for competence. When employees are encouraged to actively participate in addressing psychosocial issues within their workplace, it signals trust in their capabilities to effectively navigate and overcome work-related challenges, thereby reinforcing their sense of being valued contributors to the organization. The process of engaging in and resolving workplace challenges within a supportive environment presents an opportunity for learning, subsequently leading to an increased sense of competence. Indeed, empirical findings show that PSC is positively related to workplace learning opportunities that support the need to be competent (Idris et al., 2015; Lee & Idris, 2017).

The fulfillment of all these needs provides essential psychological nourishment that replenishes energy and invigorates employees (Ryan & Deci, 2017, Chapter 10). Because need satisfaction reflects the expression of one's natural, inborn tendencies (Deci & Ryan, 2000), it facilitates a felt sense of authenticity, enabling employees to feel more genuinely connected to and identified with their work. In this respect, higher need satisfaction is

associated with greater work engagement, as employees experience both enhanced vitality and stronger identification with their work—together fueling the motivational drive to engage in work more wholeheartedly (Deci et al., 2017). Indeed, meta-analytic evidence has documented that need satisfaction is positively related to psychological well-being and favorable work behaviors (Ryan et al., 2022; Van den Broeck et al., 2016). Taken together, we propose that a more positive individual PSC represents an intrapersonal mechanism that supports employees' basic psychological needs. This need satisfaction, in turn, promotes greater work engagement.

Hypothesis 1: Individual PSC Time 1 (T1) has a positive indirect relationship with individual work engagement Time 3 (T3) via individual basic psychological need satisfaction Time 2 (T2).

PSC, Need Frustration, and Emotional Exhaustion: The Dark Pathway

The dark pathway is conceived as the link between PSC and emotional exhaustion via need frustration. While higher PSC reflects employees' perception of their work environment as supportive of their psychological well-being, lower PSC implies that management prioritizes other agendas over employees' psychological well-being. When employees feel they are secondary to other organizational goals, it conveys a demoralizing message that their contributions are not recognized and their presence is easily replaceable. Prior research has found that employees of lower PSC groups have significantly higher risks of exposure to workplace violence, such as bullying and harassment, and thus experience low-quality interpersonal interactions at work (e.g., Dollard et al., 2017; Pien et al., 2019). Clearly, lower PSC fosters feelings of isolation and ostracism, thereby frustrating employees' need for relatedness. Additionally, lower PSC indicates both a lack of active employee participation in creating a psychologically healthy workplace and a lack of collaborative communication in which top-down communication prevails instead. Consequently, employees' perspectives,

especially those relevant to their psychological well-being, may remain unheard, suppressed, or disregarded in the organization's decision-making processes. Employees are forced into situations that they did not initiate nor desire, such as excessive workloads (Idris et al., 2012) and illegitimate tasks (Schulte-Braucks & Dormann, 2019), thwarting their sense of choice and volition and thereby frustrating their need for autonomy. The perception of a controlling and unappreciative work environment can also frustrate employees' need for competence. It does so by engendering feelings among employees of not being trusted by management and of being incapable of contributing to the organization's goals, leading employees to doubt their competence to cope with and master their work environment.

Frustration of these needs resembles psychological malnourishment or starvation, leading to the depletion of one's energy (Olafsen et al., 2017). Besides being deprived of the psychological nutrients necessary to sustain energy, employees whose innate needs are frustrated are also more likely to perceive their work as devoid of personal meaning and to rely on internal or external pressures to complete their tasks, such as self-imposed regulation toward performance targets or externally imposed rules and structures. This suggests that engaging in work that frustrates basic psychological needs requires substantial effort and entails energy expenditure and depletion. Thus, employees who experience greater need frustration are especially vulnerable to emotional exhaustion, both from a lack of psychological nutrients and from the energy-draining nature of maintaining work efforts that conflict with their inherent psychological drives. Consistent with this, research has shown that need frustration is strongly linked to various indicators of ill-being, including depressive symptoms and emotional exhaustion (Chen et al., 2015, Olafsen et al., 2017). Accordingly, we posit that within an organization, employees who perceive higher levels of PSC tend to experience lower need frustration, which in turn leads to lower emotional exhaustion.

Hypothesis 2: Individual PSC T1 has a negative indirect relationship with individual emotional exhaustion T3 via individual basic psychological need frustration T2.

The Moderating Roles of Organizational PSC Level: Between-Organization Mechanism

First-stage moderation

The moderating effects of an organization's overall PSC level on the relationship between individual PSC and need-satisfying/frustrating experiences (i.e., first stage of mediation) are rooted in the role of organizational climate in shaping shared norms and expectations that guide individual experiences and behaviors (Beus et al., 2023; Schneider et al., 2017). In organizations with higher overall PSC, the prioritization of psychological well-being permeates all levels, reinforcing supportive psychosocial safety behaviors in day-to-day work, such as seeking support, engaging in open communication, and showing concern for others' well-being. Consequently, employees with higher individual PSC are more likely to experience greater need satisfaction, as they can leverage the opportunities provided by the higher PSC environment to express their inherent tendency to seek challenges, undertake new tasks, and pursue learning opportunities at work, knowing they have the support of their supervisors and peers (Deci et al., 2017). In contrast, in organizations with lower overall PSC levels, even employees with relatively high individual PSC perceptions are at a disadvantage when it comes to need satisfaction, as the broader climate is more extrinsically oriented (e.g., prioritizing productivity and profits) than intrinsically supportive, weakening the link between individual PSC and need satisfaction. Considering the moderating role of organizational PSC in conjunction with the mediating mechanism proposed in Hypothesis 1, we expect the first stage of the indirect relationship between individual PSC and work engagement to be conditional on the level of organizational PSC. That is, in organizations with higher contextual PSC, the collective commitment to psychological well-being

strengthens the relationship between individual PSC and need satisfaction; this in turn corresponds with increased work engagement.

> *Hypothesis 3a:* Organizational PSC level moderates the first stage of the positive indirect relationship between individual PSC and individual work engagement via individual need satisfaction, such that the indirect relationship becomes stronger as organizational PSC level increases.

Simultaneously, higher individual PSC is more strongly linked to lower need frustration in higher PSC organizations because the broader climate is likely to discourage and penalize psychosocially harmful behaviors, thereby protecting employees from exposure to workplace stressors that would otherwise undermine their basic psychological needs. The safeguarding nature of higher PSC organizations amplifies the protective effect of individual PSC, further strengthening its negative association with need frustration. By contrast, in lower PSC organizations where psychosocial risks and hazards are more prevalent (Dollard et al., 2017; Pien et al., 2019), higher individual PSC alone is insufficient to safeguard against the detrimental effects of these stressors because employees remain subject to potentially harmful work situations within the broader organizational context. As a result, employees remain vulnerable to need frustration despite holding relatively favorable individual PSC perceptions, weakening the negative association between individual PSC and need frustration. Extending the rationale from Hypothesis 2, we further propose that individual PSC is more strongly and negatively associated with emotional exhaustion through reduced need frustration in higher PSC organizations, as employees in these contexts are afforded greater protection by the broader climate; those with higher individual PSC experience even lower need frustration and, consequently, greater reductions in emotional exhaustion.

> *Hypothesis 4a:* Organizational PSC level moderates the first stage of the negative indirect relationship between individual PSC and individual emotional exhaustion via

individual need frustration, such that the indirect relationship becomes stronger as organizational PSC level increases.

Second-stage moderation

We also expect that the relationship between need satisfaction and work engagement (i.e., second stage of mediation) varies as a function of organizational PSC level. The psychosocial safety norms and practices upheld in higher PSC organizations create an environment where employees feel safe from psychosocial risks and feel supported by ample resources (Dollard & Bakker, 2010). Under these conditions, employees can fully channel the energy derived from the satisfaction of their basic psychological needs into their work tasks, without having to divert that energy toward managing potential psychosocial threats. Thus, employees whose needs are satisfied within higher PSC environments are better positioned to act in accordance with their innate inclinations to engage actively and interact effectively with their work (Deci & Ryan, 2000), resulting in greater work engagement. When organizations have lower overall PSC, however, employees are likely to perceive that extrinsic work values (e.g., economic considerations) are prioritized over their well-being. As Van den Broeck et al. (2014) note, "the deliberate promotion of extrinsic values by the organization may create a competitive, dog-eat-dog atmosphere with few winners and many losers" (p. 1908). In such a fiercely competitive and psychosocially unsafe environment, even employees who personally have their needs fulfilled might hesitate to fully engage in their work to protect their self-interest, weakening the link with which need satisfaction promotes work engagement. Building on Hypothesis 1, we anticipate that in higher PSC organizations, the relationship between individual PSC and work engagement via need satisfaction will be stronger, as the organization's psychosocially safe environment and its intrinsic value orientation foster a stronger link between need satisfaction and work engagement.

Hypothesis 3b: Organizational PSC level moderates the second stage of the positive indirect relationship between individual PSC and individual work engagement via individual need satisfaction, such that the indirect relationship becomes stronger as organizational PSC level increases.

While higher PSC organizations offer a psychosocially safe work environment that strengthens the link between need satisfaction and work engagement, they also protect against the harmful effects of need frustration by providing ample resources to cope with workplace stressors. Even when employees feel their basic psychological needs are thwarted, they are at a lower risk of emotional exhaustion because the overall climate provides the necessary support to effectively manage the associated stress (Dollard & Bakker, 2010). Conversely, in the adverse environment of lower PSC organizations, where the pursuit of extrinsic work goals (e.g., maximizing productivity, meeting quotas) overshadows psychosocial aspects of work, supervisors are likely to resort to controlling tactics (e.g., strict deadlines, surveillance, and sanctions) to comply with these extrinsic targets, often as a consequence of "the intense pressures … that lead them to take the short, carrot-and-stick route to prompting productivity" (Ryan & Deci, 2017, p. 534). In such contexts, employees whose psychological needs are already frustrated are likely to experience even greater, if not double, depletion, as they must not only work harder to meet these demanding work expectations but also endure top-down pressures with limited psychosocial support, further aggravating their emotional exhaustion. Extending Hypothesis 2, at lower organizational PSC levels, the indirect relationship between individual PSC and emotional exhaustion becomes stronger, because a more demanding and less supportive climate intensifies the depleting effects of need frustration, leaving employees more vulnerable to emotional exhaustion.

Hypothesis 4b: Organizational PSC level moderates the second stage of the negative indirect relationship between individual PSC and individual emotional exhaustion via

individual need frustration, such that the indirect relationship becomes stronger as organizational PSC level decreases.

Interaction Effects Between PSC Level and PSC Strength: Between-Organization Mechanism

First-stage moderation

As noted earlier, climate level represents the average (mean) PSC perception shared among group members. Nevertheless, "group members exposed to the same processes of social sensemaking may evidence variability in climate perceptions" (Beus et al., 2023, p. 2028). Thus, PSC strength—the degree of agreement among employees—is a crucial contextual factor that can intensify or weaken the influence of the overall climate level. The interaction between PSC level and strength offers insights beyond the average alone, indicating how consistently the PSC level is perceived and how widely the shared sense of psychosocial safety is endorsed across the organization (Bowen & Ostroff, 2004; Schneider et al., 2002). In stronger, more positive climates, employees receive clear and consistent signals from both management and peers regarding the importance of psychosocial safety. When supervisors and peers consistently behave in alignment with the organization's espoused values, employees are more likely to internalize those values through social contagion (Radel et al., 2010). This shared understanding and internalization of psychosocial safety practices creates an optimal organizational climate that continuously reinforces and strengthens employees' individual PSC perceptions, thereby amplifying the relationship between individual PSC and need satisfaction. Likewise, in stronger, more negative climates, employees are likely to observe consistent violations of psychosocial safety norms, sending a powerful message that management disregards their psychological well-being. These pervasive and strong negative signals undermine the positive effects of individual PSC as employees are frequently exposed to psychosocial hazards that inhibit the satisfaction of their

basic psychological needs. This creates a context that is least conducive to translating any potential benefits of favorable individual PSC perceptions. On the contrary, organizational climates where psychosocial safety cues are inconsistent or difficult to interpret resemble weaker situations. In weaker climates, whether the PSC level is higher or lower relative to other groups, employees may experience heightened distress due to the unpredictable outcomes of their actions, as they lack the clear expectations and behavioral norms that stronger climates provide. This uncertainty increases the psychological risks of acting on their individual PSC perceptions for fear of acting out of sync with the group and being socially rejected (Cialdini & Goldstein, 2004), weakening the relationship between individual PSC and need satisfaction. Integrating the moderating role of between-organization PSC with the mediation process proposed in Hypothesis 1, we further posit that climates with both higher organizational PSC level and PSC strength maximally amplify the first stage of the bright pathway due to the unified interpretation of psychosocial safety practices which, in turn, improves work engagement.

> *Hypothesis 5a:* The interaction between organizational PSC level and PSC strength moderates the first stage of the positive indirect relationship between individual PSC and individual work engagement via individual need satisfaction, such that the magnitude of the indirect relationship will be the strongest when both organizational PSC level and PSC strength are high (high-level, strong climate).

Similarly, employees with higher individual PSC are likely to experience even lower need frustration in stronger, more positive climates due to the widespread and consistent endorsement of psychosocial safety principles, which protect them from daily stressors and harmful workplace experiences that contribute to need frustration. However, in stronger, more negative climates, the clear message that hostile or malicious behaviors are tolerated or even accepted normalizes mistreatment in the workplace, leaving even employees with

favorable individual PSC vulnerable to need frustration (Dollard et al., 2017; Pien et al., 2019). As noted above, the interaction effects of organizational PSC level and PSC strength are less potent in weaker climates due to inconsistencies and uncertainties that discourage employees from acting on their individual PSC, thereby weakening the relationship between individual PSC and need frustration. Expanding on Hypothesis 2, we propose that the negative relationship between individual PSC and need frustration would be strongest in organizations with higher PSC level and PSC strength, where the uniformly supportive climate amplifies this link by shielding employees from harmful occurrences, which in turn lowers emotional exhaustion.

> *Hypothesis 6a:* The interaction between organizational PSC level and PSC strength moderates the first stage of the negative indirect relationship between individual PSC and individual emotional exhaustion via individual need frustration, such that the magnitude of the indirect relationship will be the strongest when both organizational PSC level and PSC strength are high (high-level, strong climate).

Second-stage moderation

The clarity and stability offered by stronger, more positive climates promote a sense of control over the environment and peace of mind (Bowen & Ostroff, 2004). This enables employees to more fully invest the energy derived from need satisfaction by focusing their attention on role requirements and by exerting greater effort in their work, resulting in higher levels of work engagement. Alternatively, in weaker climates where organizational expectations are unclear or inconsistent, energy gained from need satisfaction is likely to be diverted toward managing uncertainty and ambiguity, thus weakening the positive relationship between need satisfaction and work engagement. In stronger, more negative climates, the positive association between need satisfaction and work engagement may weaken as performance indicators are perceived to be continually prioritized over employee

well-being. Such strongly endorsed extrinsic priorities are likely to lead employees to internalize the message that they are viewed merely as instruments for productivity, evoking feelings of dehumanization (Ryan & Deci, 2017, Chapter 11). Consequently, employees may become disheartened, reluctant to invest the energy derived from need satisfaction toward meaningful engagement at work, or they may simply be too preoccupied with coping and managing stress in such a strong, precarious climate. Considering the moderating roles of between-organization PSC along with the theoretical process outlined in Hypothesis 1, we propose that in climates where both organizational PSC level and PSC strength are high, the mediation relationship between individual PSC and work engagement will be strongest, as consistent support for psychological well-being amplifies the positive link between need satisfaction and work engagement.

> *Hypothesis 5b:* The interaction between organizational PSC level and PSC strength moderates the second stage of the positive indirect relationship between individual PSC and individual work engagement via individual need satisfaction, such that the magnitude of the indirect relationship will be the strongest when both organizational PSC level and PSC strength are high (high-level, strong climate).

In contrast, the relationship between need frustration and emotional exhaustion is expected to be most pronounced in stronger, more negative climates. High agreement in these climates indicates an unsafe work environment where workplace stressors are inadequately addressed and psychosocial safety norms are frequently violated. The adverse environment aggravates the effects of need frustration, further depleting employees' energy reserves and thus accelerating emotional exhaustion. By comparison, the harmful effects of need frustration may be less pronounced in weaker climates where signals about management's stance on employee well-being are less clear and the disregard for well-being is not as consistently reinforced. Finally, the relationship between need frustration and emotional

exhaustion may eventually subside in stronger, more positive climates. Because psychosocial safety policies and practices are deeply embedded and consistently enacted within these organizations, employees experiencing need frustration are likely to benefit from increased availability of psychosocial resources and support, enabling them to manage the resulting distress with greater ease and thereby reduce their risk of emotional exhaustion. Extending Hypothesis 2, we expect that individual PSC will be most strongly associated with emotional exhaustion through need frustration when lower organizational PSC levels are combined with higher PSC strength because such conditions signal a consistently unsupportive climate, which accentuates the relationship between need frustration and emotional exhaustion.

> *Hypothesis 6b:* The interaction between organizational PSC level and PSC strength moderates the second stage of the negative indirect relationship between individual PSC and individual emotional exhaustion via individual need frustration, such that the magnitude of the indirect relationship will be the strongest when organizational PSC level is low and PSC strength is high (low-level, strong climate).

Method

Transparency and Openness

In the following sections, we describe our sampling plan, all data exclusions, and all measures. We adhered to the *Journal of Applied Psychology* methodological checklist. This study was approved by the Institutional Review Board at University of Malaya (UM.TNC2/UMREC_1678: “Longitudinal and shortitudinal effects of psychosocial safety climate on employees’ psychological wellbeing and work outcomes”). The data presented in this article were part of a broader data collection effort; this is the first publication from that dataset. Data are not available due to their proprietary nature; however, the scales used, analysis codes, output files, and other supplemental materials (i.e., Appendices A and B) can be accessed as additional online materials available at

https://osf.io/z49xb/?view_only=aa08c5d3cdc7427ea63100d62df60317. Data were analyzed using Mplus Version 8.3 (Muthén & Muthén, 1998–2017) and R version 4.2.3 (R Core Team, 2022). Study designs and analyses were not preregistered.

Participants

Three-wave longitudinal data were collected from March 2022 to March 2023 from Malaysian government agencies in the health and community services sector. The average time interval between T1 and T2 was 4 months; the average time interval between T2 and T3 was 5 months. We used different time intervals to maximize the chances of including the true causal lag (Taris & Kompier, 2014). The selection of 4- and 5-month time lags was (a) informed by previous studies that examined the mediating role of basic psychological needs in the workplace, which commonly employed durations ranging from 3 to 6 months (e.g., Huyghebaert, Gillet, Fernet, et al., 2018; Kleszewski & Otto, 2023; Olafsen et al., 2017) and (b) aimed to ensure adequate separation between our measurements while not spacing surveys so far apart as to unnecessarily increase participant attrition. We also conducted optimal time lag analyses (Dormann & Griffin, 2015) to estimate the most appropriate time frame for future longitudinal studies of the associations between PSC, basic psychological needs, and well-being. The results indicate that, generally, the optimal time frame for detecting the effects among the study variables ranges from 4 months to 1 year (see Figure A1 and Figure A2 in additional online Appendix A[3]). Therefore, the selected time lags fall within the appropriate time frame for investigating the hypothesized effects.

We approached the management of each agency for permission to conduct the study through an online survey that took around 20–25 minutes. Participants were recruited (a) with the help of human resource officers who advertised the study among their staff members and

[3] Appendix A can be found in the additional online material at https://osf.io/y6te4?view_only=aa08c5d3cdc7427ea63100d62df60317

(b) by sending personalized emails to the staff members with invitations to participate in the online survey. To be eligible, participants had to be adults employed full-time and not away from work during the survey period (e.g., medical, maternity, or sabbatical leave). Participants received information about the nature and purpose of the study and were assured of voluntary participation, anonymity, and the confidentiality of their responses. They had the flexibility to complete the surveys at their own pace, without any pressure from the organizations to respond in a specific manner. At T2 and T3, the same organizations and participants who took part at T1 were approached by sending emails with a link to the online survey. To ensure confidentiality, all surveys were returned directly to the first author's email account. Data were matched across time based on a unique identification number and email addresses provided by the participants.

Because the exact number of staff members invited to participate via advertisements from human resource officers was not known, we were unable to calculate the overall and within-department response rates. Nevertheless, the following details of respondents' participation patterns and sample characteristics are reported. Of the 1281 respondents from 62 departments who participated in the survey, 22.4% (n = 287) participated in only one wave, 77.6% (n = 994) participated in at least two waves, and 51.1% (n = 654) participated in all three waves. Given the focus of this study on the causal influence of one variable on another, we included only those who completed at least two of the surveys to ensure the data captured at least one period during which a change may have occurred. Departments with very small clusters (fewer than five individuals) were removed. The final matched sample comprised 983 participants (76.7%) from 59 departments (95.2%). Participating employees per department ranged from five to 79, with an average size of 16.7 participants. The sample comprised full-time human service workers, including social workers, counsellors, health workers, and educators. Most were female (78.5%). The mean age of participants was 41.2

years (*SD* = 8.4, range = 23–61). All participants were Malaysian. The majority (89.7%) identified as Malay, while 0.6% identified as Chinese, 1.4% as Indian, and 8.2% as Indigenous. Education levels ranged from secondary school (22.3%), diploma (48.8%), and bachelor's degree (21.0%) to postgraduate degrees (2.7%) and others (5.2%). Organizational tenure ranged from 0.3 to 41.5 years (*M* = 13.2; *SD* = 8.3). To investigate the potential impact of attrition, differences on study variables were tested between participants who participated at least twice (retained) and participants who participated only once (drop-out). For only two variables (autonomy need frustration T1 and relatedness need frustration T1), participants who dropped out reported higher values than retained participants (autonomy need frustration T1: $d = 0.2$, $p = .02$; relatedness need frustration T1: $d = 0.3$, $p < .01$). There were no significant differences for any of the other variables, including demographic characteristics (sex, age, ethnicity, educational levels, and organizational tenure), implying little bias in the sampling across time.

Measures

All study measures were administered in Malay. Following Brislin's (1970) back-translation method, the first author translated the measures into Malay, after which the third author reviewed the translation and discussed any concerns with the first author. A bilingual researcher specializing in organizational behavior then back-translated the Malay version into English to ensure accuracy and consistency with the original.

PSC Level

PSC was assessed with the 12-item PSC scale (Hall et al., 2010). The scale consisted of four domains (each measured by three items), namely: (a) management commitment (e.g., "In my workplace, senior management acts quickly to correct problems/issues that affect employees' psychological health"); (b) management priority (e.g., "Psychological well-being of staff is a priority for this organization"); (c) organizational communication (e.g.,

"Information about workplace psychological well-being is always brought to my attention by my manager"); and (d) organizational participation (e.g., "In my organization, the prevention of stress involves all levels of the organization"). All items employed a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Following Geldhof et al. (2014), we calculated McDonald's omega (ω) at both the within- and between-organization levels using multilevel confirmatory factor analysis (CFA), while also accounting for sampling error in the observed cluster means (Lai, 2021). We conducted a multilevel CFA with the four domains as the first-order factors loaded on a single higher order PSC factor at both the within- and between-organization levels across each wave (within-organization ω ranged from .97 to .98; between-organization ω ranged from .83 to .90).

With respect to justifying the treatment of PSC as a multilevel construct, we examined its variability between organizations, intraclass coefficients (ICC[1] and ICC[2]), and its homogeneity within organizations using the within-group interrater agreement index ($r_{WG[J]}$) as a measure of within-group agreement. The ICC(1) values (.07 [T1], .12 [T2], and .05 [T3]), along with the *F*-values from the one-way analysis of variance, F (58, 895) = 2.24, $p < .001$ at T1; F (58, 832) = 3.10, $p < .001$ at T2; and F (58, 716) = 1.75, $p < .001$ at T3, indicated that a significant proportion of the variance in PSC scores at each time point was attributable to group membership (Bliese et al., 2018). The ICC(2) values were .55 (T1), .68 (T2), and .43 (T3). Despite the fact that the ICC(2) values were below the conventional cutoff of .70, it is not unusual for climate research with small group sizes to have ICC(2) values in the .40–.60 range (Bliese et al., 2018; Ehrhart et al., 2014). The within-department agreement using the $r_{WG(J)}$ index indicated strong levels of agreement across all measurement occasions for a uniform null distribution: mean $r_{WG(J)}$ T1 = .96 (*SD* = .04); mean $r_{WG(J)}$ T2 = .96 (*SD* = .04); and mean $r_{WG(J)}$ T3 = .97 (*SD* = .02). Taken together, a multilevel modeling approach seemed justified.

PSC Strength

We used the SD of employees' PSC within each organization to measure PSC strength. SD is an appropriate measure when within-group dispersion of the organizational members' PSC is of interest (Afsharian et al., 2018; Krasikova & LeBreton, 2019). To represent climate strength and to facilitate the interpretation of our findings, we multiplied the SD by −1 (smaller [more negative] values indicate lower PSC strength, larger [less negative] values indicate higher PSC strength; Afsharian et al., 2018).

Basic Psychological Need Satisfaction and Need Frustration

Need satisfaction and need frustration were measured with the 18-item Work-Related Basic Need Satisfaction Scale (Van den Broeck et al., 2010). We omitted one item from the autonomy frustration subscale ("If I could choose, I would do things at work differently") because of a very low corrected item–total correlation at all three measurement waves (mean $r = .10$). The 17-item scale comprised: 10 items for need satisfaction, with three items for autonomy satisfaction (e.g., "I feel like I can be myself at my job"), three items for relatedness satisfaction (e.g., "At work, I feel part of a group"), and four items for competence satisfaction (e.g., "I am good at the things that I do in my job"). The remaining seven items measured need frustration, with two items for autonomy frustration (e.g., "In my job, I feel forced to do things I do not want to do"), three items for relatedness frustration (e.g., "I often feel alone when I am with my colleagues"), and two items for competence frustration (e.g., "I don't really feel competent in my job"). All items were rated on a 5-point scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Although need satisfaction and need frustration are conceptualized as individual-level attributes, we accounted for the clustering effect of employees nested within organizations by specifying separate multilevel CFAs for need satisfaction and need frustration. Each model included a hypothesized within-level structure and a saturated between-level structure (i.e., specifying covariances between

all items; Lai, 2021). At the within level, we tested a second-order factor structure to determine whether a global need satisfaction/frustration measure was appropriate. The specified higher order factor structures showed acceptable fit across all three waves for both need satisfaction and need frustration. Within-organization ω for need satisfaction ranged from .92 to .94, and for need frustration, from .80 to .85.

Work Engagement

Work engagement was assessed using the 9-item Utrecht Work Engagement Scale (Schaufeli et al., 2006) which taps three dimensions (each measured by three items): vigor (e.g., "At my work, I feel bursting with energy"), dedication (e.g., "My job inspires me"), and absorption (e.g., "I feel happy when I am working intensely"), scored on a 5-point scale from 1 = *strongly disagree* to 5 = *strongly agree*. We omitted the absorption dimension because two of its items consistently had corrected item-total correlations below .40 across all three waves. This decision aligns with previous findings, which suggest that absorption is less predictive of work engagement than vigor and dedication due to its conceptual overlap with workaholism (for a review, see Di Stefano & Gaudiino, 2019). Since work engagement is a within-organization construct, we specified a multilevel CFA with a hypothesized within-level structure (i.e., both vigor and dedication loaded onto a higher order factor) and a saturated between-level structure (within-organization ω ranged from .96 to .97).

Emotional Exhaustion

Emotional exhaustion was assessed with the 8-item exhaustion subscale of the Oldenburg Burnout Inventory (Demerouti et al., 2010; e.g., "After work, I tend to need more time than in the past in order to relax and feel better"). Items were scored on a 4-point scale from 1 = *strongly disagree* to 4 = *strongly agree*. After appropriate item reversal, a multilevel CFA with a hypothesized within-level structure (i.e., one-factor model) and a saturated

between-level structure was performed and indicated satisfactory model fit at all waves; within-organization ω ranged from .83 to .85).

Analytic Strategy

As individual observations were nested in teams, multilevel path analyses (Preacher et al., 2010) and slopes-as-outcomes multilevel modeling in Mplus 8.3 (Muthén & Muthén, 1998–2017) were used to test Hypotheses 1 and 2, and Hypotheses 3 to 6, respectively. The full information maximum likelihood estimation with standard errors that are robust to non-normality and nonindependent observations (MLR) was used for all analyses. The MLR estimator is superior for accommodating nested data and allows the use of all available information by assuming data are missing at random (Hox et al., 2017). To analyze Hypotheses 1 and 2, we accounted for PSC over time at both the within-organization and between-organization levels of analysis (our theoretical focus on PSC as a multilevel construct) but allowed basic psychological needs, work engagement, and emotional exhaustion to remain only at the within-organization level.

To test the hypotheses longitudinally, we opted for cross-lagged panel analysis to account for the influence of previous levels of all variables and to estimate the cross-lagged relations simultaneously. First, we included autoregressive paths between adjacent time points (e.g., PSC T2 regressed on PSC T1; PSC T3 regressed on PSC T2) to account for the proportion of variance explained by itself at a previous time point as we were interested in examining whether the antecedents at earlier time points would have any predictive power after controlling for the previous values of the outcome measures. By modeling these autoregressive paths, we automatically controlled for the influence of background variables and thus there was no need to explicitly include sociodemographic variables as covariates in our models (Zapf et al., 1996). Second, hypothesized cross-lagged paths were specified (e.g., need satisfaction T2 regressed on PSC T1; work engagement T3 regressed on need

satisfaction T2). These cross-lagged effects represent their unique effect after controlling for the stability information from the prior measurement occasions. Third, the covariances among variables at the first wave were modelled (e.g., the covariance between PSC T1 and need satisfaction T1), as well as the covariances among the residuals of the variables at each subsequent wave (e.g., the covariances between PSC T2 residuals and need satisfaction T2 residuals). This accounts for the time-specific effects common to all variables within the same wave. The mediation effects proposed in Hypotheses 1 and 2 were tested using Monte Carlo simulation[4] to calculate the 95% confidence intervals (CIs) around the estimates (Selig & Preacher, 2008). This method has been shown to be superior to other alternatives as it accurately reflects the asymmetric nature of the sampling distribution of an indirect effect (Preacher et al., 2010).

Due to the complexity of autoregressive cross-lagged multilevel models, attempting to estimate them using a full structural equation modeling (i.e., simultaneous estimation of measurement and structural models) is not feasible as this often leads to convergence failure and/or improper solutions such as Heywood cases, non-positive definite matrices, and parameter estimates that exceed their plausible range (Hox et al., 2017). We thus estimated our hypothesized model using the factor scores saved from separate multilevel CFAs estimated for each variable, as described in the Measures section. Since latent mean centering—a method that "accounts for the sampling error in the mean estimate" (Asparouhov & Muthén, 2019, p. 122)"—was applied in these multilevel CFA models, the resulting factor scores at both the within- and between-group levels were already properly centered; therefore, additional centering was unnecessary. Although factor scores are not

[4] We conducted Monte Carlo simulations with 20,000 replications using the open-source software R, found at https://www.quantpsy.org/medmc/medmc.htm (Selig & Preacher, 2008).

error-free, they are a more favorable alternative to composite scores due to their reduced susceptibility to measurement error (Smid & Rosseel, 2020).

In addition to the mediation analyses, we conducted several multilevel models with random slopes (i.e., slopes-as-outcomes multilevel modeling; Raudenbush & Bryk, 2002) to test the cross-level interactions specified in Hypotheses 3–6. A random slopes model allows each organization to have its own unique slope, which can vary as a function of Level-2 moderators (i.e., organizational PSC level and strength), and thus assumes sufficient variance in those slopes for cross-level interactions to be meaningful. We confirmed that all random slopes relevant to the hypotheses showed significant variance: individual PSC–need satisfaction ($\tau_{11} = .023$, $p = .038$), individual PSC–need frustration ($\tau_{11} = .029$, $p = .034$), need satisfaction–work engagement ($\tau_{11} = .101$, $p = .036$), and need frustration–emotional exhaustion ($\tau_{11} = .055$, $p = .040$). Note that the Level-2 moderators were also added as predictors of the random intercept terms for the hypothesized Level-1 relationships, as main effects must always be included when testing moderating effects (Hayes, 2022). We also controlled for prior levels of all outcome measures to account for their potential influence, ensuring a more robust analysis of the moderating effects over time. Finally, we calculated the index of moderated mediation (IMM) coefficients and computed the Monte Carlo CIs for each IMM coefficient to determine if the indirect effects at different levels of Level-2 moderators are significantly different from one another (Hayes, 2022).

Results

Measurement Model

Table 1 presents the means, SDs, reliabilities, and within- and between-organization correlations between the factor scores. Prior to hypothesis testing, we conducted multilevel CFA to evaluate the discriminant validity of our variables at each measurement point. We first performed individual-level CFA on PSC, need satisfaction, need frustration, work

engagement, and emotional exhaustion as they were all assessed through the same survey completed by employees. The structure of each variable was specified as described in the previous section. As shown in additional online Appendix B[5], the hypothesized five-factor structure (M1) showed satisfactory fit across all three time points and was significantly better fit than alternative models: (a) a four-factor model (M2) that combined need satisfaction and need frustration; (b) a four-factor model (M3) in which all items for well-being variables were constrained to load on one factor; and (c) a one-factor model (M4) that loaded all variables onto a single factor. The CFA results at the individual level demonstrated the discriminant validity of the core constructs, providing a sufficient basis for examining the multilevel structure of the data. We then constructed multilevel CFA models comprising the hypothesized five factors. As previously noted, we specified PSC according to its hypothesized structure at both the within- and between-organization levels. For need satisfaction, need frustration, work engagement, and emotional exhaustion, the hypothesized structure is specified at the within level, while the between level is saturated to account for clustering effects. The multilevel CFA of the five-factor model showed acceptable fit at both the individual and organizational levels of analysis, as indicated by level-specific fit indices (Asparouhov & Muthén, 2018; Ryu & West, 2009; see additional online Appendix B). In sum, these results provided evidence in support of the discriminant validity of the study variables at both levels of analysis.

Hypotheses Testing

The proposed cross-lagged panel model (CLPM; see Figure 2) provided a satisfactory fit to the data, $\chi 2\ (44) = 188.96$, $p < .001$, comparative fit index = .97, Tucker–Lewis index = .92, root-mean-square error of approximation = .06, standardized root-mean-square residual

[5] Appendix B can be found in the additional online material at https://osf.io/nbm9a?view_only=aa08c5d3cdc7427ea63100d62df60317

for the within level ($SRMR_{within}$) = .06, and for the between level ($SRMR_{between}$) = .00, thereby providing justification to interpret the parameter estimates associated with our hypotheses. Unstandardized coefficient estimates of all the hypotheses are presented in Figure 3. Hypothesis 1 posited that need satisfaction would mediate the influence of PSC on work engagement. Supporting Hypothesis 1, we found a significant indirect relationship between individual PSC T1 and individual work engagement T3 as mediated by individual need satisfaction T2 (*ab* = 0.031, *SE* = 0.012, 95% CI [0.008, 0.056]). Hypothesis 2 stated that PSC would decrease emotional exhaustion through need frustration. Supporting Hypothesis 2, individual PSC T1 was negatively related to individual emotional exhaustion T3 via individual need frustration T2 (*ab* = −0.030, *SE* = 0.015, 95% CI [−0.066, −0.006]).

We also examined two alternative mediational paths to rule out the possibility that PSC relates to work engagement through need frustration and to emotional exhaustion through need satisfaction. The results of the CLPM (Figure 2) revealed that need satisfaction did not predict subsequent emotional exhaustion and prior levels of need frustration were not associated with future work engagement. As a result, the indirect relationship between individual PSC and emotional exhaustion via need satisfaction was not significant (*ab* = 0.006, *SE* = 0.005, 95% CI [−0.004, 0.018]) nor was the indirect relationship between individual PSC and work engagement via need frustration (*ab* = 0.006, *SE* = 0.007, 95% CI [−0.006, 0.024]). These findings reinforce the idea that need satisfaction and need frustration are distinct constructs, with need satisfaction uniquely contributing to healthy functioning indicators whereas need frustration has a unique effect on negative indicators of well-being.

The moderated mediation[6] results for Hypotheses 3 to 4 are presented in Table 2. For both hypotheses, we controlled for PSC strength to offer a more accurate representation of

[6] The terms “moderated mediation” and “conditional indirect relationship” are used interchangeably to denote that the magnitude of an indirect effect is conditional upon the values of one or more moderators.

the moderating effects of organizational PSC level. Hypothesis 3 stated that the indirect relationship between individual PSC and work engagement through need satisfaction is contingent on organizational PSC level. Supporting Hypothesis 3a, cross-level interaction between organizational PSC level T1 and individual PSC T1 was significantly related to need satisfaction T2, subsequently leading to increased work engagement T3 (IMM = 0.031, *SE* = 0.010, 95% CI [0.012, 0.054]). Following Hayes (2022), we plotted the interaction effects at conditional values of organizational PSC level, using the 16th and 84th percentiles to represent "relatively low" and "relatively high" levels of the moderator. Conditional indirect effects of X on Y at various values of moderator(s) were calculated using formulae provided by Stride et al. (2015). As shown in Table 2 and Figure 4, the conditional indirect relationship between individual PSC and work engagement through need satisfaction was consistently positive, with a stronger effect at higher organizational PSC levels (i.e., 84th percentile) and a nonsignificant effect at lower PSC levels (i.e., 16th percentile). However, we found no significant moderation at the second stage of the indirect relationship (IMM = −0.018, *SE* = 0.015, 95% CI [−0.054, 0.008]), failing to support Hypothesis 3b.

Hypotheses 4a and 4b predicted the indirect relationship between individual PSC and emotional exhaustion via need frustration would be contingent upon organizational PSC level. Failing to support Hypothesis 4a, we found no significant moderation at the first stage (IMM = −0.010, *SE* = 0.011, 95% CI [−0.034, 0.011]), that is, organizational PSC level did not moderate the relation between individual PSC and need frustration, and, consequently, there was no indirect relationship with emotional exhaustion. In contrast, we observed a significant moderated mediation effect at the second stage (IMM = 0.026, *SE* = 0.013, 95% CI [0.002, 0.056]). As shown in Table 2 and Figure 5, the conditional indirect relationship between individual PSC and emotional exhaustion was stronger in organizations with lower

PSC than in those with higher PSC, as lower organizational PSC levels amplified the detrimental effect of need frustration on emotional exhaustion, supporting Hypothesis 4b.

Hypotheses 5 and 6 investigated the interaction between organizational PSC level and PSC strength on the mediational processes that link individual PSC to employee well-being (see Table 3). The results showed that Hypotheses 5a and 5b were not supported, indicating that the organizational PSC level × PSC strength interaction was significant on neither the first stage (IMM = 0.019, *SE* = 0.040, 95% CI [−0.065, 0.098]) nor the second stage (IMM = −0.017, *SE* = 0.046, 95% CI [−0.117, 0.068]) of the mediation process linking individual PSC to work engagement.

In relation to the moderated mediation relationship between individual PSC and emotional exhaustion (Hypotheses 6a and 6b), the results showed no significant moderation at the first stage (IMM = 0.001, *SE* = 0.042, 95% CI [−0.092, 0.088]), thus, Hypothesis 6a was not supported. However, we found a significant second stage moderated mediation effect (IMM = 0.177, *SE* = 0.069, 95% CI [0.062, 0.329]). An inferential test for the conditional indirect effects (see Table 3 and Figure 6) revealed that the negative indirect relationship between individual PSC T1 and emotional exhaustion T3 via need frustration T2 was most pronounced when organizational PSC level was lower and PSC strength was higher. Moreover, this negative indirect relationship was not significant under contexts of higher organizational PSC level and higher PSC strength. In other words, relatively low individual PSC led to greater need frustration, which, in turn, increased emotional exhaustion, more so among organizations with climates characterized by higher strength and lower level (i.e., stronger, more negative climates). Conversely, in climates with higher level and higher strength (i.e., stronger, more positive climates), the need frustration stemming from low individual PSC did not translate into emotional exhaustion. We thus conclude that Hypothesis 6b was supported. It is also important to clarify the rationale behind the inclusion of

combinations such as (a) higher PSC level with lower PSC strength and (b) lower PSC level with lower PSC strength in Table 3 and Figure 6. These combinations were included to provide insight into how weaker climates function across varying organizational PSC levels. Here, "higher" and "lower" values reflect relative comparisons based on the 16th and 84th percentiles within our dataset, rather than absolute values, as low agreement in absolute terms would be mathematically impossible at very high or low PSC levels due to reduced variability at either end of the scale (Hayes, 2022).

Discussion

PSC plays a foundational role in supporting human sustainability by cultivating a psychologically healthy work environment that enables employees to engage meaningfully while preserving their capacity to contribute in the long run. Yet, the psychological mechanisms underlying the PSC–well-being relationship remain insufficiently understood as current theoretical perspectives are largely limited to job design models. This issue is further compounded by a methodological misalignment in which the multilevel nature of PSC is often examined using single-level or conflated multilevel analytical approaches. Guided by SDT (Deci et al., 2017), the present study aimed to explore the main and moderating effects of PSC on employees' need satisfaction and need frustration, and how these experiences in turn might affect work engagement and emotional exhaustion. Consistent with our expectations, our results provided longitudinal evidence for the mediating role of need satisfaction and need frustration in the relationship between PSC and both work engagement and emotional exhaustion. Specifically, the results implied that, over time, individual perceptions of PSC activated a bright pathway through its positive relationship with work engagement via need satisfaction and mitigated a dark pathway through its negative relationship with emotional exhaustion via need frustration. In addition, we found some evidence that these relationships were partly conditioned by the organizational context. In the

bright pathway, higher organizational PSC levels amplified the relationship between individual PSC and need satisfaction (first stage moderation), which subsequently enhanced employee engagement. For the dark pathway, it was both PSC level and its interaction with PSC strength that significantly influenced the mediating process, particularly by accentuating the relationship between need frustration and emotional exhaustion (second stage moderation). Notably, the negative indirect relationship between individual PSC and emotional exhaustion was most pronounced when organizational PSC was low, especially in contexts with higher PSC strength, indicating that employees are most likely to experience emotional exhaustion resulting from need frustration when the climate is both negative and strong.

Theoretical Implications

Our findings have several theoretical implications. First, we offer a new theoretical perspective to explicate how PSC relates to work engagement and emotional exhaustion by shifting away from the predominant focus on job demands and resources (e.g., Dollard & Bakker, 2010; Hu et al., 2022) toward employees' own distinct psychological experiences, which remain relatively underexplored. By showing that the satisfaction and frustration of basic psychological needs constitute alternative mediating mechanisms, our research thus adds nuance to the understanding of the PSC–well-being relation, clarifying a psychological mechanism that more proximally links PSC to well-being than job demands and resources (Ryan et al., 2022). This suggests that the role of PSC extends beyond merely shaping job demands and resources; it also serves as a contextual resource that supports employees' innate growth-oriented nature by fulfilling their basic psychological needs—the proximal drivers of well-being because they are considered the "nutrients that are essential for well-being" (Ryan & Deci, 2017, p. 213). Importantly, our findings also imply that PSC may exert a more sustainable and long-lasting influence on work engagement and emotional exhaustion

than previously assumed under the JD–R theory, as basic need satisfaction is theorized to cultivate a "fuller, more enduring, and deeper sense of well-being" (Ryan & Deci, 2000, p. 323). Moreover, by identifying PSC as a need-supportive work context, we provide additional insight into SDT by broadening its focus from individual, interpersonal, and leadership factors (e.g., Olafsen et al., 2015; Trépanier et al., 2023; see also Van den Broeck et al., 2016) to organizational climate, which, as a broader organizational factor, can fulfill employees' basic psychological needs more systematically on a larger scale than these previously studied micro-level factors.

Second, we contribute to the PSC literature by demonstrating that PSC induces qualitatively distinct need-based experiences, activating different psychological processes that uniquely affect work engagement and emotional exhaustion. Importantly, both the bright and dark pathways remain significant even after accounting for the influence of the other, illustrating the motivating and protective roles of PSC in shaping employee well-being. By explicitly demonstrating that PSC not only nurtures employees' growth-oriented tendencies through need satisfaction but also shields them from the more vulnerable expressions of human nature by mitigating need frustration, our findings provide further empirical evidence supporting the conceptualization of PSC as a "climate for psychosocial health and safety" (Dollard & Bakker, 2010, p. 580) as well as its relevance in explaining a variety of well-being outcomes. Because work engagement and emotional exhaustion are just two of many possible indicators of well-being, this opens new avenues for exploring how PSC influences a broader range of employee functioning through these dual processes. Moreover, research on basic psychological needs has traditionally emphasized need satisfaction, often disregarding need frustration as an independent construct with unique implications for employee well-being. In response to Vansteenkiste et al.'s (2020) call to distinguish these constructs, we provide empirical evidence that need satisfaction uniquely contributes to work engagement

and need frustration independently drives emotional exhaustion, each with distinctive explanatory power. We thus extend the application of SDT, revealing that well-being can—and perhaps should—be understood through two complementary pathways: need satisfaction and need frustration, which more accurately reflect human inclination towards both self-actualization and self-protection (Ryan & Deci, 2000).

Third, our results provide insight into the multilevel nature of PSC. Departing from prior scholarship that has largely relied on traditional single-level models (e.g., Huyghebaert, Gillet, Fernet, et al., 2018) or multilevel models that conflate individual and group effects (e.g., Idris et al., 2015), we adopt a multilevel conceptualization of PSC that distinguishes between within- and between-organization variance in PSC perceptions, an approach consistent with a more contemporary theorization of organizational climate (Beus et al., 2023). By distinguishing between different forms of PSC (i.e., individual PSC, organizational PSC level, and PSC strength), we reveal that each has a distinctive role in the PSC–well-being relationship and that, together, they exhibit more complex interaction effects on employee outcomes than traditionally assumed. This insight is crucial because it suggests that the current understanding within PSC research is not merely incomplete, but that conflating different forms of PSC may lead to potentially erroneous conclusions about how its effects unfold across organizational levels. Our research also contributes more generally to the organizational climate literature by underscoring the importance of (a) studying climate as a multilevel construct that differentiates between its within- and between-level components, given that its effects are unlikely to be isomorphic and (b) examining the interaction between climate level and climate strength, as their combined effect conveys more nuanced information than climate level alone (Beus et al., 2023).

Finally, our longitudinal mediation model provides important theoretical insight into the temporal dynamics of PSC in relation to both work engagement and emotional exhaustion

by identifying the appropriate time lags at which these cross-lagged effects are likely to occur (Dormann & Griffin, 2015). The existing well-being literature lacks scholarly knowledge and evidence regarding the optimal time lags for detecting such effects, with most studies relying on cross-sectional data (e.g., Hu et al., 2022; Idris et al., 2015). Even when longitudinal designs are used, the choice of measurement interval is often based on prior research, logistic constraints, or other practical considerations rather than empirical justification (e.g., Huyghebaert, Gillet, Fernet, et al., 2018; Yulita et al., 2022). Poorly selected time intervals can result in underestimated, overestimated, or undetected mediation effects (Timmons & Preacher, 2015). Our optimal time lag analysis (see additional online Appendix A[7]) contributes to the literature by empirically identifying that the lagged effects among the study variables take place within a 12-month period. More precisely, intervals of 3 to 6 months for PSC to influence need-based experiences, followed by another 3 to 6 months for need-based experience to influence work engagement or emotional exhaustion, are optimal for capturing the cross-lagged effects. This finding helps refine longitudinal study designs by suggesting a reference time frame for future research on these relationships. It also inspires future studies to conduct optimal time lag analysis to determine the most effective intervals, offering empirical justification for the chosen measurement intervals.

Practical Implications

Supporting employee well-being is both a goal in itself and a key driver of human sustainability and long-term organizational success. Profit-driven strategies often overlook the devastating long-term effects on employee well-being and overall organizational development, whereas humanistic management approaches build a sustainable workforce that forms the foundation for long-term organizational performance. The current study provides

[7] Appendix A can be found in the additional online material at https://osf.io/y6te4?view_only=aa08c5d3cdc7427ea63100d62df60317

evidence-based insights for organizations regarding how employee well-being can be promoted through an employee-centric climate. First, given that both individual PSC and the overall organizational PSC level contribute to the satisfaction of employees' basic psychological needs, it is important for organizations to take steps to deliberately cultivate a need-supportive climate by espousing and enacting psychosocial safety priorities (Dollard & Bakker, 2010; Hall et al., 2010). For instance, organizations can involve employees in the development of policies related to psychosocial safety at work. This participatory approach not only conveys respect for employees' autonomy and enhances their sense of competence and inclusion but also instills a sense of ownership that motivates employees to commit to and engage in these psychosocial safety practices, thus perpetuating a need-supportive climate (Dollard & Bakker, 2010). In addition, recognizing managers who actively enact and uphold these policies helps the formation of this need-supportive climate at the collective level. At an individual level, these needs can be supported through various psychosocial safety practices such as providing career-related and psychosocial mentoring, listening and responding to employees' ideas and concerns, and allowing flexibility in working arrangements.

Second, because low individual PSC actively frustrates employees' basic psychological needs and because its downstream effect on emotional exhaustion is further exacerbated in organizations with strong agreement about low PSC, we urge organizational leaders to be cognizant of the risks associated with disregarding psychosocial safety priorities. To prevent harmful psychosocial practices from being institutionalized, we suggest that organizations enhance leaders' readiness and ability to mitigate need-frustrating conditions in the workplace. This can be achieved by training leaders to recognize early signs of depletion, to engage in active listening, to practice perspective taking, and to provide feedback in an informational manner rather than in a controlling manner (for a review, see

Slemp et al., 2021). Leaders who model psychosocially safe behaviors (e.g., showing genuine concern and respect for coworkers, acknowledging coworkers' efforts and contributions) can also help employees internalize these practices and values, thereby cultivating a stronger and more favorable PSC that reduces need frustration and its associated adverse effects.

Limitations and Directions for Future Research

The following limitations should be noted when interpreting the findings of the present study, each of which also provides directions for future research. First, self-report data were used to measure both predictor and outcome variables, and although necessary steps were taken to ensure that common method variance was not a serious problem, such as using a longitudinal design to reduce the bias of collecting data at one point in time from a single source (Ployhart & Vandenberg, 2010) whilst controlling for time of testing effects, possible biases must be acknowledged. Future research could further reduce these biases by adopting a split sample design (Hu et al., 2022), in which the PSC of an independent group of respondents (e.g., participants at T1 only) predicts the outcome in the second group (e.g., participants at both T1 and T2), or by integrating perceptions from other observers, including supervisor ratings and co-worker reports of employee well-being, as well as objective indicators of well-being (e.g., blood pressure, cortisol levels).

Second, we investigated only the mediating effects of need satisfaction and need frustration. Future research would undoubtedly benefit from the inclusion of job demands and resources to theoretically and empirically compare the explanatory ability of the JD–R theory and SDT. It is plausible that, when combined, these two theories may collectively provide a more comprehensive understanding of the relationship between PSC and well-being than each theory considered alone. For example, future research could replicate and extend the current model by incorporating job demands and resources as external contingencies and

basic psychological needs as internal psychological mechanisms to investigate the mediating effects of both external and internal factors in the PSC–well-being relation.

Third, while we focused on employee well-being (i.e., work engagement and emotional exhaustion) as an important outcome, there have been increasing calls for a mutual gains approach to the employment relationship, one in which both employers and employees benefit, creating a win–win scenario (Guest, 2017). Prior research has shown that when an organization prioritizes procedures and practices that promote psychological well-being (i.e., PSC), employees, in return, respond positively, as evidenced by various indicators of performance (Zadow et al., 2019). Future research could extend our findings by examining the role of basic needs and well-being in contributing to valued organizational outcomes such as job performance, productivity, absenteeism, and turnover. Furthermore, given the importance of PSC, future research should explore the antecedents of PSC to understand how these climate perceptions are formed among employees.

Fourth, we conceptualized employee well-being in terms of work engagement and emotional exhaustion, as their role as immediate motivational and strain-related outcomes allowed us to capture early manifestations of more distal, long-term indicators of well-being in response to need-based experiences. However, it is important to acknowledge that these constructs have also been theorized as intervening variables that precede and influence well-being outcomes rather than as direct measures of well-being (Bakker et al., 2014). Future research could benefit from incorporating more direct measures of well-being that capture both its hedonic (e.g., job satisfaction, positive and negative affect) and eudaimonic (e.g., work meaningfulness, self-realization) dimensions (Ryan & Deci, 2001).

Finally, while the basic psychological needs are universal and should have roughly equivalent effects in any cultural context examined (Chen et al., 2015), this universality claim applies primarily to the outcomes of the model but not to the inputs. In other words, any

person, regardless of individual or cultural characteristics, should experience wellness from the satisfaction of these needs and distress from the frustration of these needs. Nonetheless, there may be cultural differences in how individuals' needs are supported or thwarted (Magson et al., 2022; Vansteenkiste et al., 2020). To illustrate, the implementation versus violation of PSC principles, such as providing opportunities for personal choice to enhance well-being versus decisions made by managers that do not align with employees' interests, might have varying degrees of impact on employees' need satisfaction and need frustration across culturally diverse nations. It is possible that lower levels of PSC are more strongly associated with increased need frustration in individualistic societies than in collectivist societies due to the generally accepted cultural value of respect for authority within collectivist cultures (Hagger et al., 2014; Hofstede, 2001). Thus, research that replicates the present investigation in different cultural contexts would increase confidence in the generalizability of our findings.

Conclusion

We found support for a longitudinal, multilevel conceptual framework for understanding employee well-being by integrating PSC within SDT. Our findings reveal the multilevel nature of PSC: PSC at the individual level acts as an antecedent to two initial manifestations of employee well-being, namely, work engagement and emotional exhaustion via the satisfaction and frustration of basic psychological needs, respectively, and there is some evidence that PSC at the organizational level (average group-level PSC and its interaction with PSC strength) functions as a contextual variable that moderates these individual-level relationships. Our efforts to decompose the between- and within-organization variances of PSC represent a first step toward a more nuanced and complete understanding of the effects of PSC at different levels of analysis. This investigation highlights the importance of adopting PSC principles in management practices that prioritize well-being and recognize

the intrinsic value of human life, thereby supporting individuals' capacity to thrive and flourish.

References

Afsharian, A., Dollard, M., Dormann, C., Ziaian, T., & Winefield, T. (2023). PSC through the lens of a dispersion–composition model: The beneficial effects of PSC ideal as a high and strong PSC signal. *Work & Stress*, *37*(2), 171–194. https://doi.org/10.1080/02678373.2022.2120561

Afsharian, A., Zadow, A., Dollard, M. F., Dormann, C., & Ziaian, T. (2018). Should psychosocial safety climate theory be extended to include climate strength? *Journal of Occupational Health Psychology*, *23*(4), 496–507. https://doi.org/10.1037/ocp0000101

Asparouhov, T., & Muthén, B. (2018). *SRMR in Mplus*. https://www.statmodel.com/download/SRMR2.pdf

Asparouhov, T., & Muthén, B. (2019). Latent variable centering of predictors and mediators in multilevel and time-series models. *Structural Equation Modeling*, *26*(1), 119–142. https://doi.org/10.1080/10705511.2018.1511375

Bakker, A. B., & Demerouti, E. (2017). Job demands–resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, *22*(3), 273–285. https://doi.org/10.1037/ocp0000056

Bakker, A. B., Demerouti, E., & Sanz-Vergel, A. (2023). Job demands–resources theory: Ten years later. *Annual Review of Organizational Psychology and Organizational Behavior*, *10*, 25–53. https://doi.org/10.1146/annurev-orgpsych-120920-053933

Bakker, A. B., Demerouti, E., & Sanz-Vergel, A. I. (2014). Burnout and work engagement: The JD–R approach. *Annual Review of Organizational Psychology and Organizational Behavior*, *1*, 389–411. https://doi.org/10.1146/annurev-orgpsych-031413-091235

Barnes, C. M., Wagner, D. T., Schabram, K., & Boncoeur, D. (2023). Human sustainability and work: A meta-synthesis and new theoretical framework. *Journal of Management*, *49*(6), 1965–1996. https://doi.org/10.1177/01492063221131541

Beus, J. M., Smith, J. H., & Taylor, E. C. (2023). Integrating organizational climate theory: A domain-independent explanation for climate formation and function. *Journal of Applied Psychology*, *108*(12), 2018–2039. https://doi.org/10.1037/apl0001117

Bliese, P. D., Maltarich, M. A., & Hendricks, J. L. (2018). Back to basics with mixed-effects models: Nine take-away points. *Journal of Business and Psychology*, *33*(1), 1–23. https://doi.org/10.1007/s10869-017-9491-z

Bowen, D. E., & Ostroff, C. (2004). Understanding HRM-firm performance linkages: The role of the "strength" of the HRM system. *The Academy of Management Review*, *29*(2), 203–221. https://doi.org/10.2307/20159029

Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, *1*(3), 185–216. https://doi.org/10.1177/135910457000100301

Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., Duriez, B., Lens, W., Matos, L., Mouratidis, A., Ryan, R. M., Sheldon, K. M., Soenens, B., Van Petegem, S., & Verstuyf, J. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion*, *39*(2), 216–236. https://doi.org/10.1007/s11031-014-9450-1

Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. *Annual Review of Psychology*, *55*, 591–621. https://doi.org/10.1146/annurev.psych.55.090902.142015

Deci, E. L., Olafsen, A. H., & Ryan, R. M. (2017). Self-determination theory in work organizations: The state of a science. *Annual Review of Organizational Psychology*

and Organizational Behavior, *4*, 19–43. https://doi.org/10.1146/annurev-orgpsych-032516-113108

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Demerouti, E., Mostert, K., & Bakker, A. B. (2010). Burnout and work engagement: A thorough investigation of the independency of both constructs. *Journal of Occupational Health Psychology*, *15*(3), 209–222. https://doi.org/10.1037/a0019408

Di Stefano, G., & Gaudiino, M. (2019). Workaholism and work engagement: How are they similar? How are they different? A systematic review and meta-analysis. *European Journal of Work and Organizational Psychology*, *28*(3), 329–347. https://doi.org/10.1080/1359432X.2019.1590337

Dollard, M. F., & Bakker, A. B. (2010). Psychosocial safety climate as a precursor to conducive work environments, psychological health problems, and employee engagement. *Journal of Occupational and Organizational Psychology*, *83*(3), 579–599. https://doi.org/10.1348/096317909X470690

Dollard, M. F., Dormann, C., Tuckey, M. R., & Escartín, J. (2017). Psychosocial safety climate (PSC) and enacted PSC for workplace bullying and psychological health problem reduction. *European Journal of Work and Organizational Psychology*, *26*(6), 844–857. https://doi.org/10.1080/1359432X.2017.1380626

Dormann, C., & Griffin, M. A. (2015). Optimal time lags in panel studies. *Psychological Methods*, *20*(4), 489–505. https://doi.org/10.1037/met0000041

Ehrhart, M. G., Schneider, B., & Macey, W. H. (2014). *Organizational climate and culture: An introduction to theory, research, and practice*. Routledge/Taylor & Francis Group.

Geldhof, G. J., Preacher, K. J., & Zyphur, M. J. (2014). Reliability estimation in a multilevel confirmatory factor analysis framework. *Psychological Methods*, *19*(1), 72–91. https://doi.org/10.1037/a0032138

González-Romá, V., & Hernández, A. (2014). Climate uniformity: Its influence on team communication quality, task conflict, and team performance. *Journal of Applied Psychology*, *99*(6), 1042–1058. https://doi.org/10.1037/a0037868

Guest, D. E. (2017). Human resource management and employee well-being: Towards a new analytic framework. *Human Resource Management Journal*, *27*(1), 22–38. https://doi.org/10.1111/1748-8583.12139

Hagger, M. S., Rentzelas, P., & Chatzisarantis, N. L. D. (2014). Effects of individualist and collectivist group norms and choice on intrinsic motivation. *Motivation and Emotion*, *38*(2), 215–223. https://doi.org/10.1007/s11031-013-9373-2

Hall, G. B., Dollard, M. F., & Coward, J. (2010). Psychosocial safety climate: Development of the PSC-12. *International Journal of Stress Management*, *17*(4), 353–383. https://doi.org/10.1037/a0021320

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (3rd ed.). The Guilford Press.

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations* (2nd ed.). Sage Publications.

Hox, J., Moerbeek, M., & van de Schoot, R. (2017). *Multilevel analysis: Techniques and applications* (3rd ed.). Routledge. https://doi.org/https://doi.org/10.4324/9781315650982

Hu, Q., Dollard, M. F., & Taris, T. W. (2022). Organizational context matters: Psychosocial safety climate as a precursor to team and individual motivational functioning. *Safety Science*, *14*(5), 105–124. https://doi.org/https://doi.org/10.1016/j.ssci.2021.105524

Huyghebaert, T., Gillet, N., Fernet, C., Lahiani, F.-J., & Fouquereau, E. (2018). Leveraging psychosocial safety climate to prevent ill-being: The mediating role of psychological need thwarting. *Journal of Vocational Behavior*, *107*, 111–125. https://doi.org/10.1016/j.jvb.2018.03.010

Huyghebaert, T., Gillet, N., Lahiani, F.-J., Dubois-Fleury, A., & Fouquereau, E. (2018). Psychological safety climate as a human resource development target: Effects on workers functioning through need satisfaction and thwarting. *Advances in Developing Human Resources*, *20*(2), 169–181. https://doi.org/10.1177/1523422318756955

Idris, M. A., Dollard, M. F., Coward, J., & Dormann, C. (2012). Psychosocial safety climate: Conceptual distinctiveness and effect on job demands and worker psychological health. *Safety Science*, *50*(1), 19–28. https://doi.org/10.1016/j.ssci.2011.06.005

Idris, M. A., Dollard, M. F., & Tuckey, M. R. (2015). Psychosocial safety climate as a management tool for employee engagement and performance: A multilevel analysis. *International Journal of Stress Management*, *22*(2), 183–206. https://doi.org/10.1037/a0038986

Inceoglu, I., Thomas, G., Chu, C., Plans, D., & Gerbasi, A. (2018). Leadership behavior and employee well-being: An integrated review and a future research agenda. *The Leadership Quarterly*, *29*(1), 179–202. https://doi.org/10.1016/j.leaqua.2017.12.006

International Labour Organization. (2016). *Workplace stress: A collective challenge*. https://www.ilo.org/sites/default/files/wcmsp5/groups/public/%40ed_protect/%40protrav/%40safework/documents/publication/wcms_466547.pdf

James, L. R., Choi, C. C., Ko, C.-H. E., McNeil, P. K., Minton, M. K., Wright, M. A., & Kim, K.-i. (2008). Organizational and psychological climate: A review of theory and research. *European Journal of Work and Organizational Psychology*, *17*(1), 5–32. https://doi.org/10.1080/13594320701662550

Kleszewski, E., & Otto, K. (2023). A matter of needs: Basic need satisfaction as an underlying mechanism between perfectionism and employee well-being. *Motivation and Emotion*, *47*(5), 761–780. https://doi.org/10.1007/s11031-023-10029-y

Kozlowski, S. W. J., & Klein, K. J. (2000). A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent processes. In *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions.* (pp. 3–90). Jossey-Bass/Wiley.

Krasikova, D. V., & LeBreton, J. M. (2019). Multilevel measurement: Agreement, reliability, and nonindependence. In *The handbook of multilevel theory, measurement, and analysis.* (pp. 279–304). American Psychological Association. https://doi.org/10.1037/0000115-013

Lai, M. H. C. (2021). Composite reliability of multilevel data: It's about observed scores and construct meanings. *Psychological Methods*, *26*(1), 90–102. https://doi.org/10.1037/met0000287

Lee, M. C. C., & Idris, M. A. (2017). Psychosocial safety climate versus team climate: The distinctiveness between the two organizational climate constructs. *Personnel Review*, *46*(5), 988–1003. https://doi.org/10.1108/PR-01-2016-0003

Loh, M. Y., Idris, M. A., Dollard, M. F., & Isahak, M. (2018). Psychosocial safety climate as a moderator of the moderators: Contextualizing JDR models and emotional demands

effects. *Journal of Occupational and Organizational Psychology*, *91*(3), 620–644. https://doi.org/10.1111/joop.12211

Magson, N. R., Craven, R. G., Ryan, R. M., Dillon, A., Mooney, J., Blacklock, F., Yeung, A. S., Kadir, M. S., & Franklin, A. (2022). A cross-cultural investigation of basic psychological need satisfaction at work in an indigenous and non-indigenous Australian sample across occupation types. *Journal of Cross-Cultural Psychology*, *53*(2), 213–238. https://doi.org/10.1177/00220221211060441

Maslach, C., & Leiter, M. P. (2016). Burnout. In *Stress: Concepts, cognition, emotion, and behavior.* (pp. 351–357). Elsevier Academic Press.

Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus user's guide* (8th ed.). Muthén & Muthén.

Olafsen, A. H., Halvari, H., Forest, J., & Deci, E. L. (2015). Show them the money? The role of pay, managerial need support, and justice in a self-determination theory model of intrinsic work motivation. *Scandinavian Journal of Psychology*, *56*(4), 447–457. https://doi.org/10.1111/sjop.12211

Olafsen, A. H., Niemiec, C. P., Halvari, H., Deci, E. L., & Williams, G. C. (2017). On the dark side of work: A longitudinal analysis using self-determination theory. *European Journal of Work and Organizational Psychology*, *26*(2), 275–285. https://doi.org/10.1080/1359432X.2016.1257611

Pfeffer, J. (2010). Building sustainable organizations: The human factor. *The Academy of Management Perspectives*, *24*(1), 34–45. https://doi.org/10.5465/AMP.2010.50304415

Pien, L.-C., Cheng, Y., & Cheng, W.-J. (2019). Psychosocial safety climate, workplace violence and self-rated health: A multi-level study among hospital nurses. *Journal of*

Nursing Management, *27*(3), 584–591. https://doi.org/https://doi.org/10.1111/jonm.12715

Ployhart, R. E., & Vandenberg, R. J. (2010). Longitudinal research: The theory, design, and analysis of change. *Journal of Management*, *36*(1), 94–120. https://doi.org/10.1177/0149206309352110

Preacher, K. J., Zyphur, M. J., & Zhang, Z. (2010). A general multilevel SEM framework for assessing multilevel mediation. *Psychological Methods*, *15*(3), 209–233. https://doi.org/10.1037/a0020141

R Core Team. (2022). *R: A language and environment for statistical computing*. In (Version 4.2.3) [Computer software]. R Foundation for Statistical Computing. https://www.R-project.org/

Radel, R., Sarrazin, P., Legrain, P., & Wild, T. C. (2010). Social contagion of motivation between teacher and student: Analyzing underlying processes. *Journal of Educational Psychology*, *102*(3), 577–587. https://doi.org/10.1037/a0019051

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods*. SAGE Publications, Inc.

Rhoades, L., & Eisenberger, R. (2002). Perceived organizational support: A review of the literature. *Journal of Applied Psychology*, *87*(4), 698–714. https://doi.org/10.1037/0021-9010.87.4.698

Ryan, R. M., & Deci, E. L. (2000). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry*, *11*(4), 319-338. https://doi.org/10.1207/S15327965PLI1104_03

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, *52*, 141–166. https://doi.org/10.1146/annurev.psych.52.1.141

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. The Guilford Press. https://doi.org/10.1521/978.14625/28806

Ryan, R. M., Duineveld, J. J., Di Domenico, S. I., Ryan, W. S., Steward, B. A., & Bradshaw, E. L. (2022). We know this much is (meta-analytically) true: A meta-review of meta-analytic findings evaluating self-determination theory. *Psychological Bulletin*, *148*(11-12), 813–842. https://doi.org/10.1037/bul0000385

Ryu, E., & West, S. G. (2009). Level-specific evaluation of model fit in multilevel structural equation modeling. *Structural Equation Modeling*, *16*(4), 583–601. https://doi.org/10.1080/10705510903203466

Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement*, *66*(4), 701–716. https://doi.org/10.1177/0013164405282471

Schaufeli, W. B., & Taris, T. W. (2014). A critical review of the job demands–resources model: Implications for improving work and health. In *Bridging occupational, organizational and public health: A transdisciplinary approach.* (pp. 43–68). Springer Science + Business Media. https://doi.org/10.1007/978-94-007-5640-3_4

Schneider, B., González-Romá, V., Ostroff, C., & West, M. A. (2017). Organizational climate and culture: Reflections on the history of the constructs in the Journal of

Applied Psychology. *Journal of Applied Psychology*, *102*(3), 468–482. https://doi.org/10.1037/apl0000090

Schneider, B., Salvaggio, A. N., & Subirats, M. (2002). Climate strength: a new direction for climate research. *Journal of Applied Psychology*, *87*(2), 220–229. https://doi.org/10.1037/0021-9010.87.2.220

Schulte-Braucks, J., & Dormann, C. (2019). The impact of psychosocial safety climate on health impairment and motivation pathways: A diary study on illegitimate tasks, appreciation, worries, and engagement among german nurses. In M. F. Dollard, C. Dormann, & M. A. Idris (Eds.), *Psychosocial safety climate: A new work stress theory* (pp. 305–324). Springer International Publishing. https://doi.org/10.1007/978-3-030-20319-1_12

Selig, J. P., & Preacher, K. J. (2008). *Monte Carlo method for assessing mediation: An interactive tool for creating confidence intervals for indirect effects*. In [Computer software]. http://quantpsy.org/

Slemp, G. R., Lee, M. A., & Mossman, L. H. (2021). Interventions to support autonomy, competence, and relatedness needs in organizations: A systematic review with recommendations for research and practice. *Journal of Occupational and Organizational Psychology*, *94*(2), 427–457. https://doi.org/10.1111/joop.12338

Smid, S. C., & Rosseel, Y. (2020). SEM with small samples: Two-step modeling and factor score regression versus Bayesian estimation with informative priors. In R. van de Schoot & M. Miočević (Eds.), *Small sample size solutions: A guide for applied researchers and practitioners* (pp. 239–254). Routledge. https://doi.org/10.4324/9780429273872

Stride, C. B., Gardner, S., Catley, N., & Thomas, F. (2015). *Mplus code for mediation, moderation, and moderated mediation models*. https://www.figureitout.org.uk/mplusmedmod.htm

Taris, T. W., & Kompier, M. A. J. (2014). Cause and effect: Optimizing the designs of longitudinal studies in occupational health psychology. *Work & Stress*, *28*(1), 1–8. https://doi.org/10.1080/02678373.2014.878494

Timmons, A. C., & Preacher, K. J. (2015). The importance of temporal design: How do measurement intervals affect the accuracy and efficiency of parameter estimates in longitudinal research? *Multivariate Behavioral Research*, *50*(1), 41–55. https://doi.org/10.1080/00273171.2014.961056

Trépanier, S.-G., Peterson, C., Ménard, J., & Notelaers, G. (2023). When does exposure to daily negative acts frustrate employees' psychological needs? A within-person approach. *Journal of Occupational Health Psychology*, *28*(2), 65–81. https://doi.org/10.1037/ocp0000338

United Nations General Assembly. (1948). *Universal declaration of human rights* (A/RES/217[III]). https://www.un.org/sites/un2.un.org/files/2021/03/udhr.pdf

United Nations General Assembly. (2015). *Transforming our world: The 2030 agenda for sustainable development* (A/RES/70/1). https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf

Van den Broeck, A., De Cuyper, N., Baillien, E., Vanbelle, E., Vanhercke, D., & De Witte, H. (2014). Perception of organization's value support and perceived employability: Insights from self-determination theory. *The International Journal of Human*

Resource Management, *25*(13), 1904–1918. https://doi.org/10.1080/09585192.2013.860385

Van den Broeck, A., Ferris, D. L., Chang, C.-H., & Rosen, C. C. (2016). A review of self-determination theory's basic psychological needs at work. *Journal of Management*, *42*(5), 1195–1229. https://doi.org/10.1177/0149206316632058

Van den Broeck, A., Vansteenkiste, M., De Witte, H., Soenens, B., & Lens, W. (2010). Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the Work-Related Basic Need Satisfaction Scale. *Journal of Occupational and Organizational Psychology*, *83*(4), 981–1002. https://doi.org/10.1348/096317909X481382

Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes, and future directions. *Motivation and Emotion*, *44*(1), 1–31. https://doi.org/10.1007/s11031-019-09818-1

World Health Organization. (2022). *World mental health report: Transforming mental health for all*. https://www.who.int/publications/i/item/9789240049338

Yu, M., Qin, W., & Li, J. (2022). The influence of psychosocial safety climate on miners' safety behavior: A cross-level research. *Safety Science*, *150*, 1–8. https://doi.org/10.1016/j.ssci.2022.105719

Yulita, Idris, M. A., & Dollard, M. F. (2022). Effect of psychosocial safety climate on psychological distress via job resources, work engagement and workaholism: A multilevel longitudinal study. *International Journal of Occupational Safety and Ergonomics*, *28*(2), 691–708. https://doi.org/10.1080/10803548.2020.1822054

Zadow, A., Dollard, M. F., Parker, L., & Storey, K. (2019). Psychosocial safety climate: A review of the evidence. In M. F. Dollard, C. Dormann, & M. A. Idris (Eds.),

Psychosocial safety climate: A new work stress theory (pp. 31–75). Springer International Publishing. https://doi.org/10.1007/978-3-030-20319-1_2

Zapf, D., Dormann, C., & Frese, M. (1996). Longitudinal studies in organizational stress research: A review of the literature with reference to methodological issues. *Journal of Occupational Health Psychology*, *1*(2), 145–169. https://doi.org/10.1037/1076-8998.1.2.145

Table 1

Means, Standard Deviations, Reliability, and Pearson's Bivariate Correlations Between Variables.

	Variable	Within-organization		Between-organization		1	2	3	4	5	6	7	8	9	10
		M	*SD*	*M*	*SD*										
1.	Age (in years)	41.19	8.38	41.41	2.87	—	.29*	−.23†	.68***	−.09	.14	.00	−.05	.16	.16
2.	Gender [a]	1.79	0.41	1.77	0.19	.05	—	−.22†	.55***	.09	.25†	.02	−.28*	.23†	.08
3.	Education [b]	2.17	0.93	2.30	0.38	−.23***	−.01	—	−.26*	−.38**	−.32*	−.15	.05	−.08	.09
4.	Organizational tenure	13.24	8.33	12.98	3.23	.77***	.09**	−.24***	—	.09	.17	.07	−.31*	.19	.25†
5.	Group size			16.66	14.79					—	.21	.11	.01	−.09	−.15
6.	PSC level T1	3.41	0.67	3.37	0.29	.09**	.02	−.04	.07*		(.97/.88)	.56***	.24†	−.12	−.17
7.	PSC level T2	3.46	0.69	3.43	0.33	.07*	−.03	−.05	.06†		.59***	(.98/.90)	.17	−.23†	−.37**
8.	PSC level T3	3.42	0.62	3.40	0.28	.12**	−.03	−.05	.02		.48***	.44***	(.97/.83)	−.26†	−.30*
9.	PSC strength T1 [c]			−0.62	0.15						−.05	−.10**	−.05	—	.60***
10.	PSC strength T2 [c]			−0.62	0.17						−.08*	−.10**	−.10**		—
11.	PSC strength T3 [c]			−0.58	0.14						−.08*	−.13***	−.03		
12.	Need satisfaction T1	3.85	0.56	3.86	0.16	.17***	−.03	.01	.15***		.43***	.31***	.26***		
13.	Need satisfaction T2	3.89	0.60	3.91	0.24	.18***	−.01	.02	.17***		.41***	.44***	.25***		
14.	Need satisfaction T3	3.84	0.58	3.86	0.22	.19***	−.05	−.03	.12**		.36***	.37***	.28***		
15.	Need frustration T1	2.30	0.67	2.26	0.21	−.12***	.02	−.02	−.07*		−.22***	−.20***	−.24***		
16.	Need frustration T2	2.23	0.69	2.21	0.27	−.12***	.02	−.04	−.07*		−.29***	−.28***	−.22***		
17.	Need frustration T3	2.21	0.70	2.19	0.27	−.08*	.02	−.03	.00		−.21***	−.26***	−.23***		
18.	Work engagement T1	4.03	0.65	4.02	0.20	.08**	−.01	.00	.08*		.46***	.39***	.28***		
19.	Work engagement T2	4.05	0.67	4.04	0.23	.09**	−.01	.05	.08*		.35***	.42***	.26***		
20.	Work engagement T3	3.95	0.65	3.92	0.21	.13***	−.03	−.03	.08*		.35***	.42***	.31***		
21.	Emotional exhaustion T1	2.40	0.51	2.39	0.17	−.06†	.07*	.00	−.03		−.33***	−.30***	−.25***		
22.	Emotional exhaustion T2	2.33	0.52	2.33	0.18	−.04	.10**	.00	.00		−.28***	−.37***	−.23***		
23.	Emotional exhaustion T3	2.31	0.55	2.31	0.19	−.07*	.08*	.03	−.03		−.31***	−.38***	−.30***		

Table 1 (continued)

Means, Standard Deviations, Reliability, and Pearson's Bivariate Correlations Between Variables.

	Variable	11	12	13	14	15	16	17	18	19	20	21	22	23
1.	Age (in years)	.10	.05	.10	−.11	.00	.08	.25†	.04	−.14	−.13	.01	.10	.02
2.	Gender [a]	−.24†	.15	.07	−.06	−.22†	−.06	.08	.09	.16	.07	−.07	−.03	.02
3.	Education [b]	.11	.05	.00	.15	−.15	−.09	−.35**	−.01	.13	−.14	−.14	−.19	−.19
4.	Organizational Tenure	.07	.05	.18	−.21	.01	.03	.46***	.00	.03	−.04	.15	−.09	.09
5.	Group size	−.12	−.02	−.02	−.02	.11	.11	.12	.04	.05	.11	.03	.00	.02
6.	PSC level T1	−.18	.34**	.31*	.03	−.27*	−.08	.09	.49***	.31*	.16	−.42***	−.26*	−.17
7.	PSC level T2	−.32*	.05	.22	−.07	.00	.00	.11	.26*	.26†	−.08	−.08	−.20	−.06
8.	PSC level T3	−.15	.15	.01	.10	.01	.04	−.18	.11	.03	.04	−.19	−.05	−.31*
9.	PSC strength T1 [c]	.44***	.01	−.03	−.09	.18	.10	.34**	.06	.05	.09	.06	.02	.10
10.	PSC strength T2 [c]	.55***	.07	.08	.01	.12	.04	.39**	.10	.10	.02	.12	.05	.01
11.	PSC strength T3 [c]	—	.00	.03	−.12	.17	.16	.33*	.09	−.03	.08	.07	.12	.15
12.	Need satisfaction T1		(.92)	.49***	.47***	−.50***	−.33*	−.10	.58***	.51***	.34**	−.30*	−.18	−.26*
13.	Need satisfaction T2		.64***	(.94)	.51***	−.37**	−.56***	−.12	.38**	.57***	.33*	−.21	−.38**	−.30*
14.	Need satisfaction T3		.56***	.65***	(.94)	−.39**	−.38**	−.53***	.22†	.46***	.49***	−.31*	−.18	−.36**
15.	Need frustration T1		−.49***	−.39***	−.45***	(.80)	.62***	.46***	−.38**	−.38**	−.17	.50***	.40**	.41**
16.	Need frustration T2		−.41***	−.49***	−.47***	.54***	(.85)	.49***	−.23†	−.49***	−.28*	.21	.56***	.41**
17.	Need frustration T3		−.39***	−.44***	−.54***	.55***	.50***	(.84)	.07	−.13	−.24†	.26*	.12	.35**
18.	Work engagement T1		.69***	.57***	.49***	−.43***	−.39***	−.36***	(.97)	.60***	.30*	−.55***	−.36**	−.42**
19.	Work engagement T2		.53***	.63***	.51***	−.35***	−.46***	−.36***	.60***	(.96)	.51***	−.38**	−.44***	−.41**
20.	Work engagement T3		.46***	.52***	.64***	−.36***	−.41***	−.41***	.53***	.55***	(.97)	−.24†	−.14	−.24†
21.	Emotional exhaustion T1		−.32***	−.28***	−.33***	.45***	.35***	.32***	−.42***	−.30***	−.33***	(.83)	.46***	.56***
22.	Emotional exhaustion T2		−.28***	−.36***	−.35***	.32***	.42***	.31***	−.39***	−.41***	−.40***	.57***	(.85)	.43***
23.	Emotional exhaustion T3		−.34***	−.34***	−.39***	.40***	.44***	.48***	−.41***	−.38***	−.39***	.55***	.60***	(.85)

Note. Correlations below the diagonal are individual-level correlations ($N = 983$). Correlations above the diagonal are organization-level correlations ($N = 59$). All correlations were calculated from factor scores obtained via multilevel confirmatory factor analyses (for more detail, see the Method section), whereas means and standard deviations were computed from raw scores. McDonald's omega coefficients are presented in parentheses along the diagonal. For PSC level, values before the slashes represent within-organization reliability estimates, while values after the slashes represent between-organization reliability estimates. The mean values for variables six to 23 are presented as average scores, calculated by dividing the total score by the number of items in each scale; T = time.

[a] Gender was coded as 1 = male, 2 = female. [b] Education was coded as follows: 1 = secondary school, 2 = college diploma or equivalent, 3 = bachelor's degree, 4 = postgraduate degree, 5 = other. [c] PSC strength was calculated by taking the within-organization standard deviation and multiplying it by −1.

$^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. All p levels are reported two-tailed.

Table 2

Indirect Relationships Through Individual Need Satisfaction and Individual Need Frustration at Lower and Higher Levels of Organizational PSC Levels

Path: Individual PSC T1 (X) → Individual need satisfaction T2 (M) → Individual work engagement T3 (Y)						
Level-2 moderator: Organizational PSC T1 (W_1) Organizational PSC T2 (W_2)	First-stage moderated mediation (H3a) W_1*X → M → Y			Second-stage moderated mediation (H3b) X → W_2*M → Y		
	Effect (*SE*)	LL	UL	Effect (*SE*)	LL	UL
Index of moderated mediation	0.031 (0.010)	**0.012**	**0.054**	−0.018 (0.015)	−0.054	0.008
Conditional indirect effect [a]						
Lower organizational PSC (16th percentile)	0.015 (0.012)	−0.007	0.041			
Higher organizational PSC (84th percentile)	0.060 (0.017)	**0.029**	**0.097**			
Path: Individual PSC T1 (X) → Individual need frustration T2 (M) → Individual emotional exhaustion T3 (Y)						
Level-2 moderator: Organizational PSC T1 (W_1) Organizational PSC T2 (W_2)	First-stage moderated mediation (H4a) W_1*X → M → Y			Second-stage moderated mediation (H4b) X → W_2*M → Y		
	Effect (*SE*)	LL	UL	Effect (*SE*)	LL	UL
Index of moderated mediation	−0.010 (0.011)	−0.034	0.011	0.026 (0.013)	**0.002**	**0.056**
Conditional indirect effect [a]						
Lower organizational PSC (16th percentile)				−0.051 (0.018)	**−0.089**	**−0.020**
Higher organizational PSC (84th percentile)				−0.012 (0.014)	−0.044	0.013

Note: Level 1, $N = 983$; Level 2, $N = 59$. A Monte Carlo simulation with 20,000 replications was used to compute the 95% confidence intervals (CIs) around the estimates. CIs that do not contain zero are significant (bolded in table). *SE* = standard error; LL = lower limit of 95% CI; UL = upper limit of 95% CI; PSC = psychosocial safety climate; T = time; H = hypothesis.

[a] We used "effect" here for consistency with standard terminology for mediation analyses but do not imply causation.

Table 3

Dual Moderated Effects of Individual PSC Through Individual Need Satisfaction and Individual Need Frustration

Path: Individual PSC T1 (X) → Individual need satisfaction T2 (M) → Individual work engagement T3 (Y)						
Level-2 moderator: Organizational PSC T1 × PSC strength T1 (W_1Z_1) Organizational PSC T2 × PSC strength T2 (W_2Z_2)	First-stage moderated mediation (H5a) W_1Z_1*X → M → Y			Second-stage moderated mediation (H5b) X → W_2Z_2*M → Y		
	Effect (*SE*)	LL	UL	Effect (*SE*)	LL	UL
Index of moderated mediation	0.019 (0.040)	−0.065	0.098	−0.017 (0.046)	−0.117	0.068
Path: Individual PSC T1 (X) → Individual need frustration T2 (M) → Individual emotional exhaustion T3 (Y)						
Level-2 moderator: Organizational PSC T1 × PSC strength T1 (W_1Z_1) Organizational PSC T2 × PSC strength T2 (W_2Z_2)	First-stage moderated mediation (H6a) W_1Z_1*X → M → Y			Second-stage moderated mediation (H6b) X → W_2Z_2*M → Y		
	Effect (*SE*)	LL	UL	Effect (*SE*)	LL	UL
Index of moderated mediation	0.001 (0.042)	−0.092	0.088	0.177 (0.069)	**0.062**	**0.329**
Conditional indirect effect [a]						
Organizational PSC Level / PSC strength						
Lower / Lower				−0.017 (0.013)	−0.046	0.006
Lower / Higher				−0.056 (0.019)	**−0.098**	**−0.023**
Higher / Lower				−0.037 (0.016)	**−0.074**	**−0.011**
Higher / Higher				0.018 (0.016)	−0.010	0.054

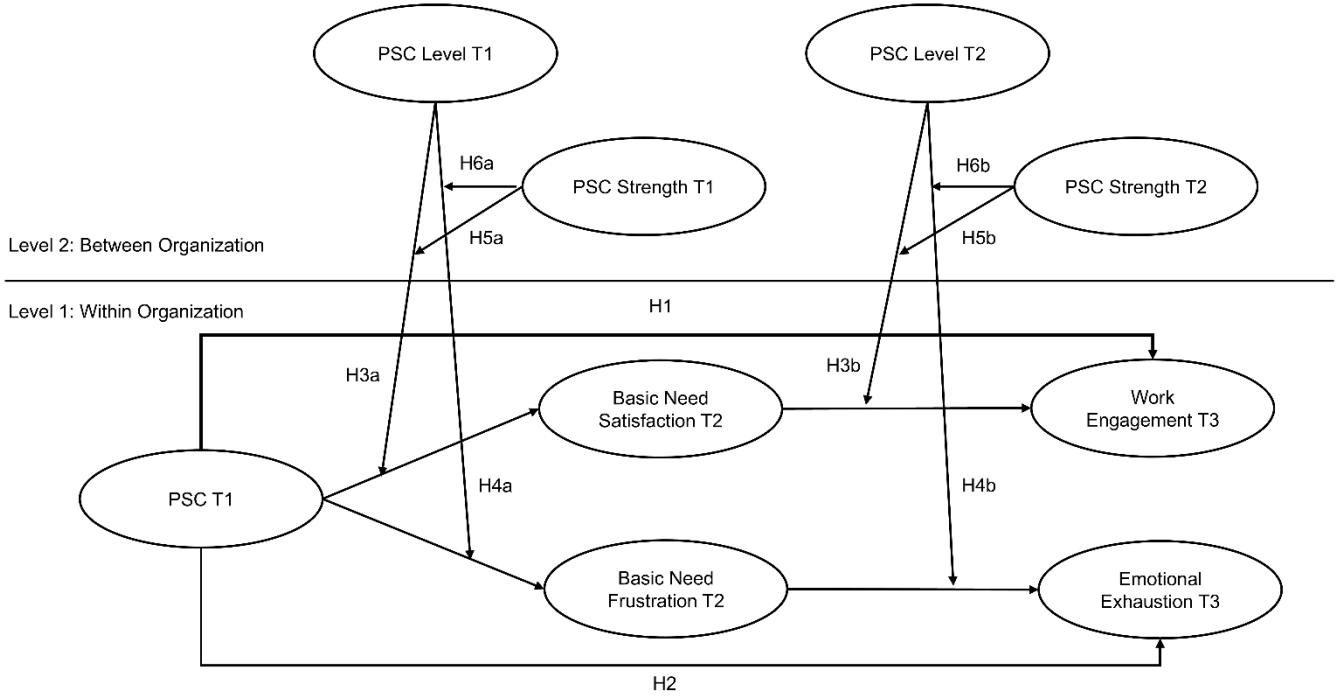
Note: Level 1, $N = 983$; Level 2, $N = 59$. A Monte Carlo simulation with 20,000 replications was used to compute the 95% confidence intervals (CIs) around the estimates. CIs that do not contain zero are significant (bolded in table). Lower and higher values of the Level-2 moderators

correspond to the 16th and 84th percentiles of the sample distribution, respectively. *SE* = standard error; LL = lower limit of 95% CI; UL = upper limit of 95% CI; PSC = psychosocial safety climate; T = time; H = hypothesis.

[a] We used "effect" here for consistency with standard terminology for mediation analyses but do not imply causation.

Figure 1

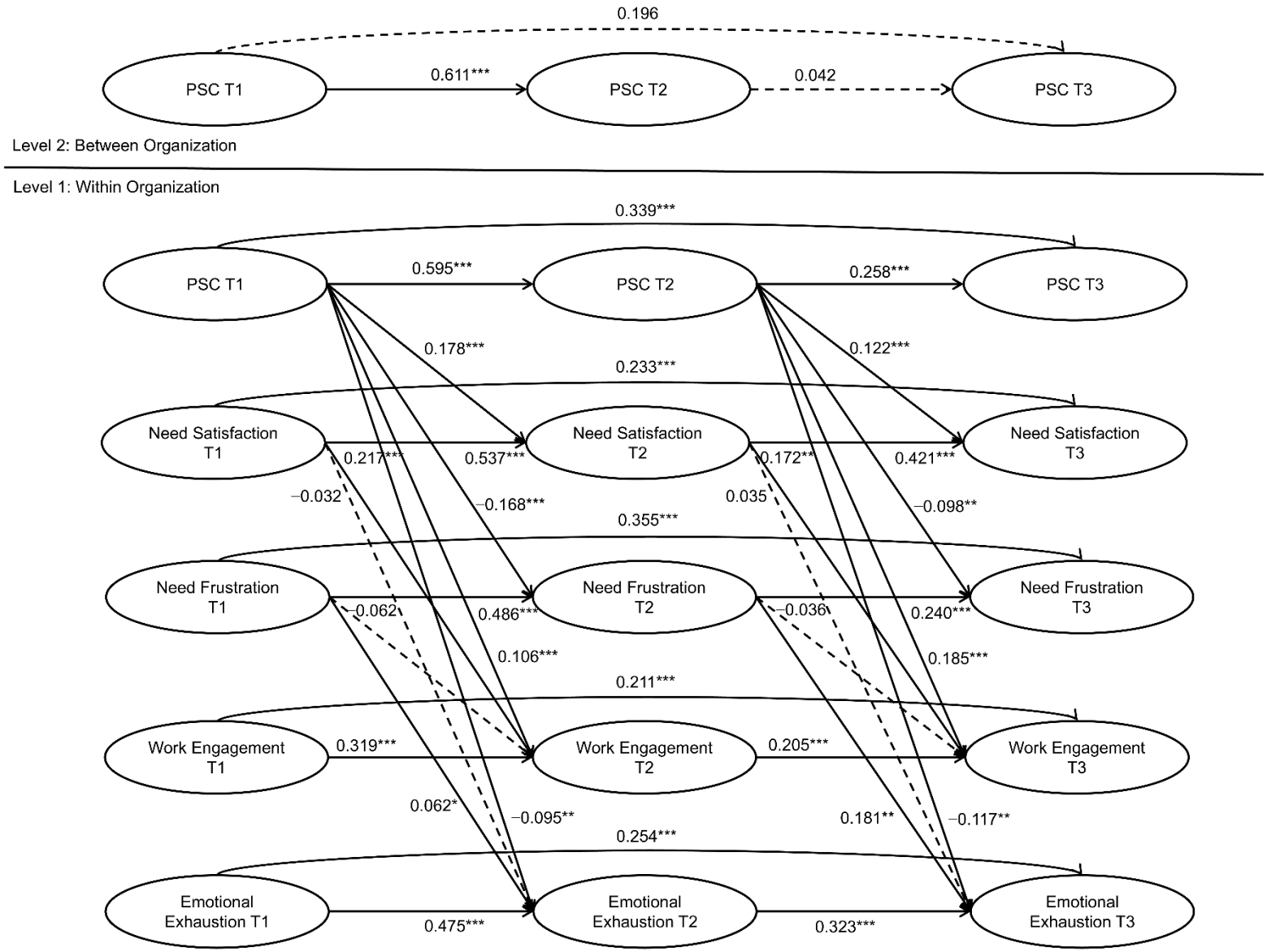
Graphical Depiction of the Theoretical Model and Hypotheses



Note. Level 1, $N = 983$; Level 2, $N = 59$. H1 and H2 represent indirect relations. H3a, H3b, H4a, and H4b represent conditional (two-way interaction) indirect relations. H5a, H5b, H6a, and H6b represent conditional (three-way interaction) indirect relations. H = hypothesis; PSC = psychosocial safety climate; T = time.

Figure 2

Cross-Lagged Panel Model Results

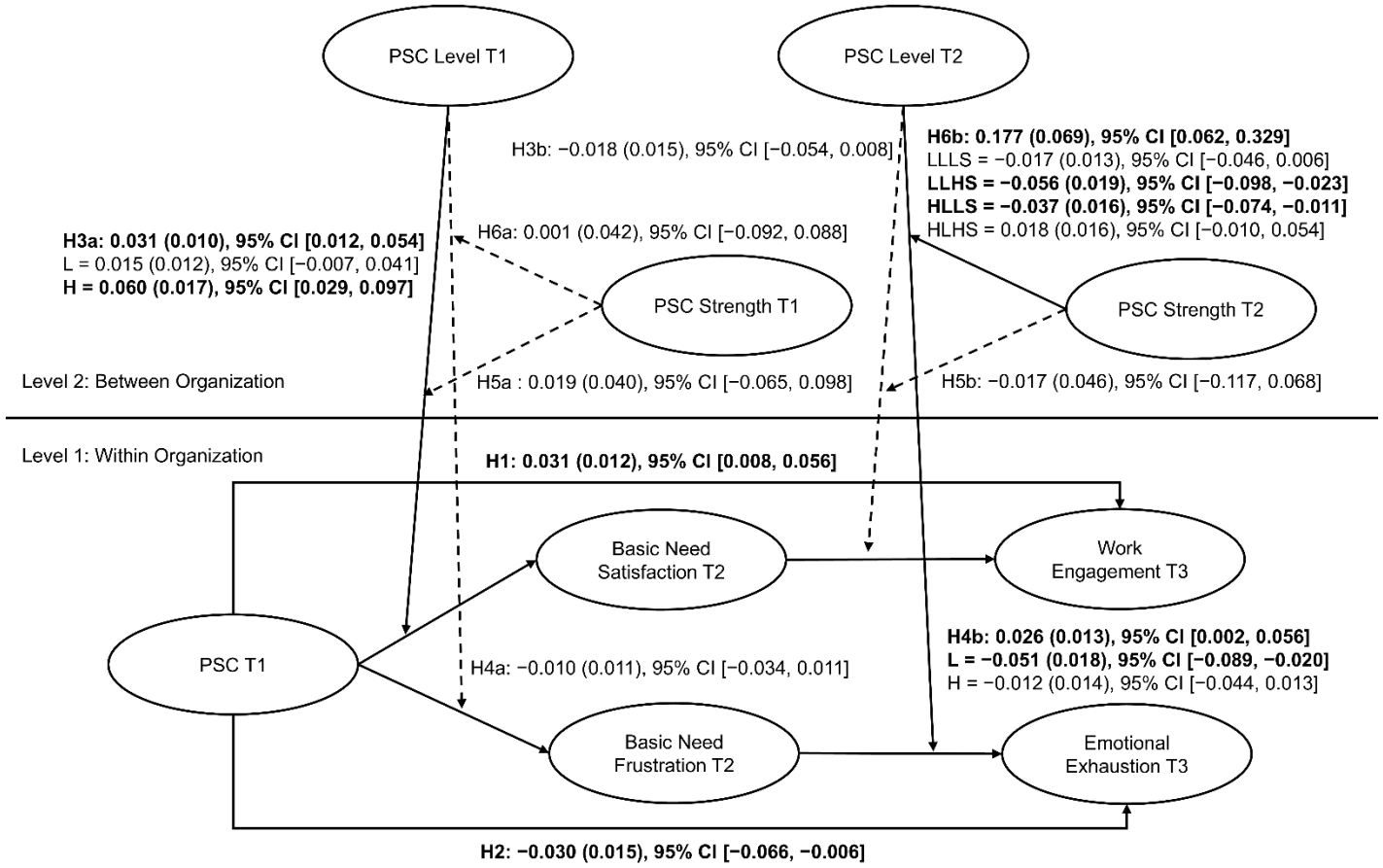

0.196
PSC T1
0.611***
PSC T2
0.042
PSC T3
Level 2: Between Organization
Level 1: Within Organization
0.339***
PSC T1
0.595***
PSC T2
0.258***
PSC T3
0.178***
0.122***
0.233***
Need Satisfaction T1
Need Satisfaction T2
Need Satisfaction T3
0.217***
0.537***
0.172**
0.421***
−0.032
−0.168***
0.035
−0.098**
0.355***
Need Frustration T1
Need Frustration T2
Need Frustration T3
−0.062
0.486***
−0.036
0.240***
0.106***
0.185***
0.211***
Work Engagement T1
Work Engagement T2
Work Engagement T3
0.319***
0.205***
0.062*
−0.095**
0.181**
−0.117**
0.254***
Emotional Exhaustion T1
Emotional Exhaustion T2
Emotional Exhaustion T3
0.475***
0.323***

Note. Level 1, $N = 983$; Level 2, $N = 59$. Values presented are unstandardized coefficients. Covariances among variables at T1 were estimated, as were the covariances among the residuals of the variables at T2 and T3. However, for the sake of parsimony, these covariances are not displayed in the model. Dotted lines represent nonsignificant relations. PSC = psychosocial safety climate; T = time.

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. All p levels are reported two-tailed.

Figure 3

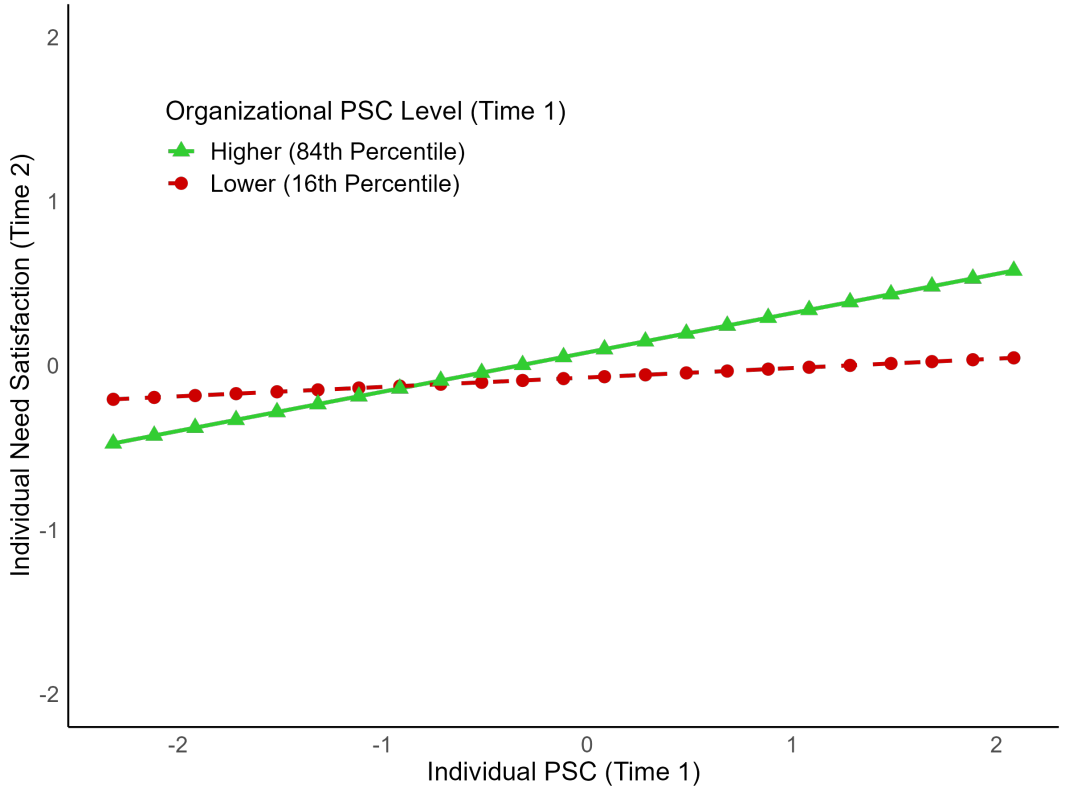
Research Model and Result Summary



Note. Level 1, $N = 983$; Level 2, $N = 59$. Values presented are unstandardized coefficients with standard errors presented in parentheses. H1 and H2 represent indirect relations. H3a, H3b, H4a, and H4b represent conditional (two-way interaction) indirect relations. H5a, H5b, H6a, and H6b represent conditional (three-way interaction) indirect relations. L refers to a relatively low organizational PSC level (16^{th} percentile); H refers to a relatively high organizational PSC level (84^{th} percentile); LLLS refers to the interaction between a relatively low organizational PSC level and a relatively low PSC strength; LLHS refers to the interaction between a relatively low organizational PSC level and a relatively high PSC strength; HLLS refers to the interaction between a relatively high organizational PSC level and a relatively low PSC strength; HLHS refers to the interaction between a relatively high organizational PSC level and a relatively high PSC strength. Dotted lines represent nonsignificant relations. Statistically significant effects are in bold for ease of interpretation. PSC = psychosocial safety climate; H = hypothesis; T = time; CI = confidence interval.

Figure 4

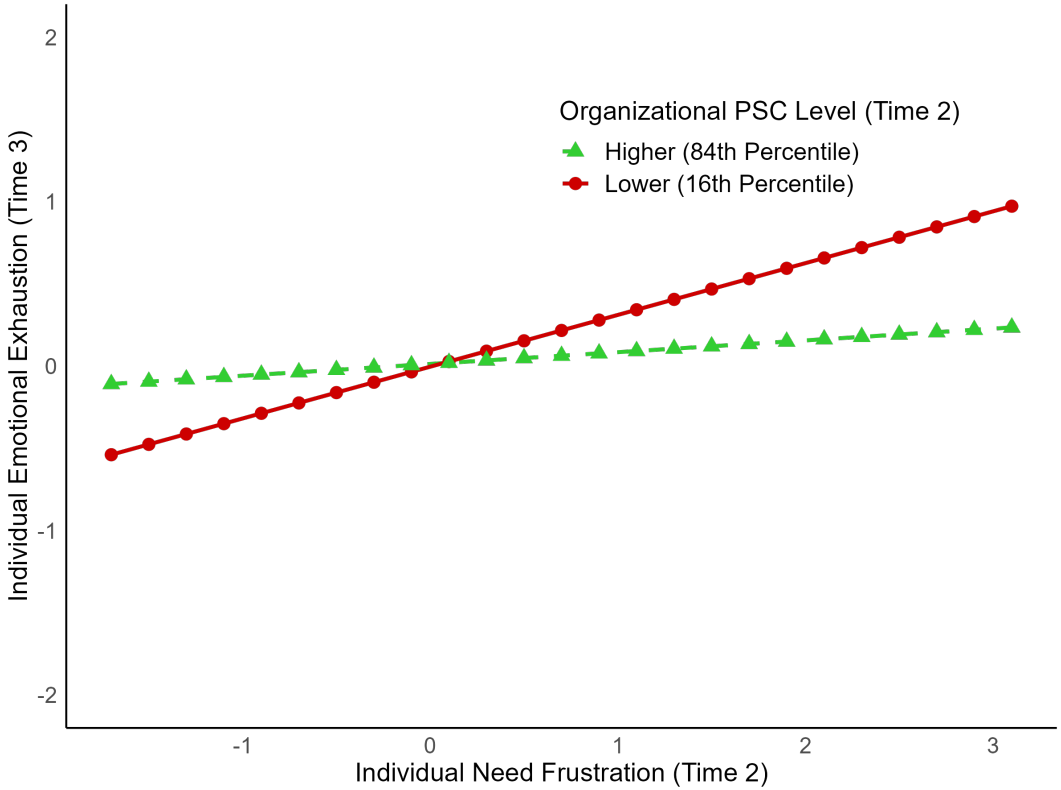
Cross-Level Two-Way Interaction Effect of Organizational PSC Level and Individual PSC on Individual Need Satisfaction Controlling for PSC Strength (H3a)



Note. In line with Hayes' (2022) recommendation, we set the covariate (PSC strength at Time 1) to its mean value for plotting the interaction. The dashed line indicates a nonsignificant simple slope. PSC = psychosocial safety climate.

Figure 5

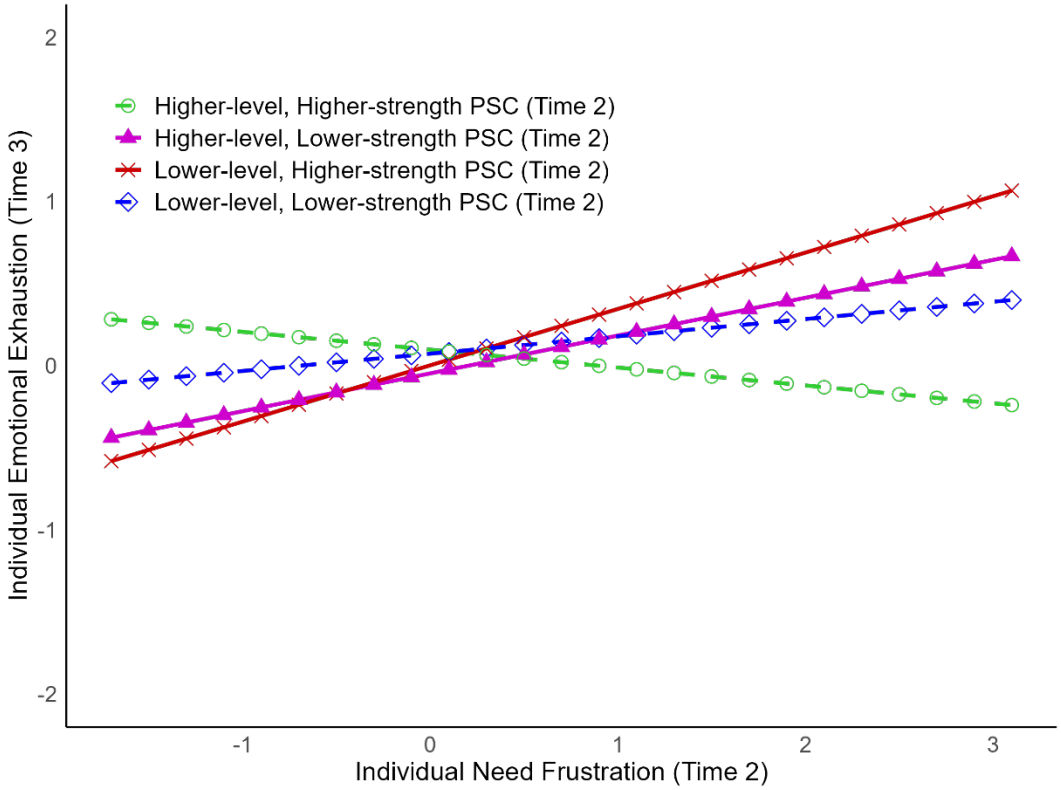
Cross-Level Two-Way Interaction Effect of Organizational PSC Level and Individual Need Frustration on Individual Emotional Exhaustion Controlling for PSC Strength (H4b)



Note. In line with Hayes' (2022) recommendation, we set the covariate (PSC strength at Time 2) to its mean value for plotting the interaction. The dashed line indicates a nonsignificant simple slope. PSC = psychosocial safety climate.

Figure 6

Cross-Level Three-Way Interaction Effects of Organizational PSC Level, PSC Strength, and Individual Need Frustration on Individual Emotional Exhaustion (H6b)



Note. "Higher" and "lower" values of PSC level and PSC strength correspond to the 84th and 16th percentiles, respectively, for each variable. Dashed lines represent a nonsignificant simple slope. PSC = psychosocial safety climate.