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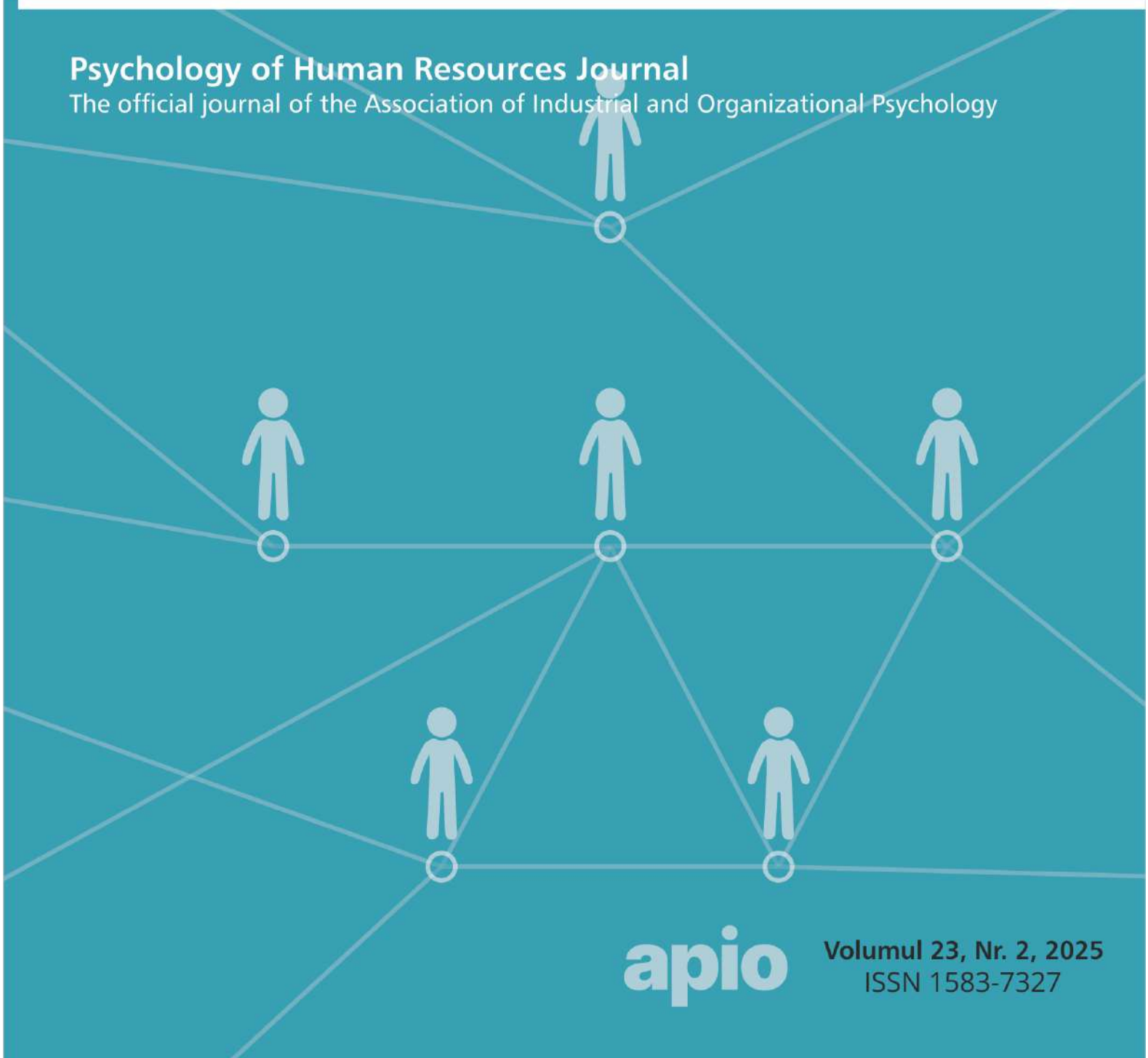

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EDITORIAL

The Economic Value of Industrial-Organizational Psychology

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A long time ago, Rauschenberger and Schmidt (1987) emphasized that although industrial-organizational psychologists had developed valid tools to evaluate the effectiveness of human resource programs, they often reported results in psychological terms (such as test validities or group differences), which were not sufficiently persuasive for managers, who tend to rely more on economic criteria and cost–benefit analyses when making decisions. However, more recent meta-analytic evidence indicates that high-performance work practices (representing human resource management policies designed to enhance employees' skills, motivation, and commitment) are positively associated with organizational performance (Saridakis, Lai, & Cooper, 2017), referring to both operational outcomes (e.g., productivity, innovation, turnover) and financial outcomes (e.g., profitability, return on assets). In order to emphasize the economic value of industrial-organizational psychology to decision-makers in public institutions and private companies, researchers introduced utility analysis, a tool for quantifying the financial value of HR practices.

Indeed, research shows that managers are more likely to recognize the value of psychological interventions when these are expressed in clear economic terms (Hazer & Highhouse, 1997). Macan and Foster (2004) investigated the role of utility analysis in managers' decision-making about selection tests. Their findings indicate that utility analysis information has small but consistent positive effects on managers' acceptance and likelihood of implementing such tests. Notably, a majority of managers who received utility analysis perceived it as one of the most influential pieces of information. Similarly, Mattson (2003) applied utility analysis to a training program and found that managers perceived financial evaluations as substantially more useful than anecdotal accounts. These results underscore that framing HR practice outcomes in economic terms through utility analysis can significantly strengthen managerial support for program adoption. Utility analysis can be used for a number of HR practices: personnel selection, training, performance management, and even occupational health psychology interventions.

Personnel Selection

Decades ago, Schmidt and colleagues (1986) assessed the economic impact of valid selection methods in the U.S. federal workforce. Employees hired through cognitive ability tests demonstrated a .487 SD performance advantage, corresponding to a 9.7% increase in output relative to those chosen through education and experience

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evaluations. For one annual hiring cohort, this translates into $600 million in additional yearly productivity, and nearly $8 billion over the average 13-year tenure of new employees. If total output is held constant, efficiency gains permit a reduction of up to 20,044 hires annually (9%), producing $272 million in yearly payroll savings. At the same time, the share of low-performing employees would decline from 10% to about 4%, a 61% decrease. These results highlight the substantial financial and performance benefits of adopting valid cognitive selection procedures in large-scale organizations. In another study, Schmidt and colleagues (1979) examined the economic impact of the Programmer Aptitude Test (a measure of numerical reasoning, figure analogies, and arithmetic problem solving) when used to select computer programmers. The test was shown to generate productivity gains of up to $97 million annually in the U.S. federal government and over $1.6 billion annually in the national economy, depending on selection ratios and prior procedures.

Thornton and Potemra (2010) evaluated the economic utility of an assessment center used for promoting police officers to sergeant in the Dallas Police Department. Despite a total cost of $158,970 (about $764 per candidate), the assessment center produced substantial net gains, with utility estimates ranging from $415,000 to $871,000 depending on the number of promotions realized. Benefits per candidate ranged from $1,995 to $4,187, and per promoted sergeant from $12,442 to $18,861, with higher estimates when broader performance variability was assumed. Even inexpensive physical ability measures can generate substantial productivity and economic benefits in selection contexts. For example, Arnold and colleagues (1982) validated the use of a simple static strength test (the arm dynamometer) for selecting entry-level steelworkers. Utility analyses indicated average gains of about $4,900 per hire, translating into annual savings of up to $9.1 million for the company.

Fine (2012) examined the economic impact of personnel selection tools designed to prevent counterproductive work behaviors (CWB). Case studies demonstrated substantial returns on investment, with annual savings averaging more than $380,000 per company in Israel and a 165% return on investment in retail settings for theft prevention alone. Despite methodological limitations, the findings highlight the significant financial value of integrity testing and similar assessments in reducing workplace deviance. Even more so, human resource management creates substantially greater financial value when organizations attract and retain star performers, whose output is disproportionately higher than that of peers. Using utility analysis across 206 samples and more than 820,000 workers, Joo and colleagues (2022) showed that accounting for stars yields financial valuations up to nine times larger than traditional models assuming normal performance distributions. Findings indicate that human resource management's financial value follows a nonlinear pattern, with significant but diminishing returns as more top performers are obtained.

Training

One study found that the average return on investment for managerial training was 84%, with sales and technical training yielding a much higher mean return on investment of 156%, significantly outperforming management training in terms of economic value (Morrow et al., 1997). Another study indicates that leadership development programs, when assessed through Return on Development Investment (RODI), can generate substantial financial benefits for organizations. Using meta-analytic data and utility analysis methods, Avolio, Avey, and Quisenberry (2010) estimated that such interventions yield highly variable outcomes, ranging from significant losses to returns exceeding 200%. Average estimates suggest positive returns of 44–87%, with the greatest gains observed when high-performing leaders are selected and when organizational contexts support the transfer of learning. Chochard and Davoine (2011) applied utility analysis to evaluate the return on investment of ten Swiss management training programs involving 158

managers. Return on investment varied dramatically, ranging from –55% (losses) to 1996% (very high gains). The most profitable were short, performance appraisal programs (return on investment between 600% and 1996%), while broader leadership and management programs produced much lower returns, sometimes negative. Training for entry-level managers yielded an average return on investment of 571%, compared to 158% for middle managers.

Performance Management

Sturman and colleagues (2003) evaluated the financial utility of performance-based pay within the context of retaining high performers. Using the utility framework, they showed that traditional cost-based or accounting analyses underestimate the economic value of incentive pay systems. While such systems may increase salary and service costs, they significantly reduce dysfunctional turnover among top performers, thereby enhancing overall workforce value. The study shows that performance-based pay emerges as a financially advantageous investment that supports organizational competitiveness in the "war for talent". One study (Florin-Thuma & Boudreau, 1987) examined the effects of a performance feedback intervention in a small retail food organization. Providing employees with feedback on serving sizes significantly reduced overserving, leading to a substantial decrease in product costs and a profitability increase of nearly 200%. Utility analysis demonstrated that the financial benefits of the intervention far exceeded implementation costs. These findings highlight that performance feedback can yield tangible organizational improvements, particularly by reducing waste and enhancing operational efficiency. Finally, goal setting yields an average productivity gain of 9.2% per employee, which corresponds to approximately $9,200 in added annual output per worker (assuming a $50,000 salary baseline) (Schmidt, 2013). For instance, a five-year program applied to 35 employees is expected to increase revenues by over $1.6 million, after accounting for implementation costs. Organizations can leverage these gains either by expanding output or by reducing labor costs: a 9.2% productivity increase allows for an 8.4% workforce reduction without loss of output, which may translate into savings of nearly $480,000 annually in a 100-employee unit.

Occupational Health Psychology Interventions

One study (Erfurt et al., 1992) examined the cost-effectiveness of four worksite wellness program models implemented in automobile manufacturing plants, targeting hypertension, obesity, smoking, and lack of physical exercise. Employees were randomly assigned to one of four interventions: (a) health education only (Site A), (b) a fitness facility (Site B), (c) health education combined with systematic follow-up counseling (Site C), and (d) health education, follow-up counseling, and plant-wide organizational strategies (e.g. walking trails) (Site D). Annual per-employee program costs ranged from $17.68 (Site A) to $39.28 (Site B). After three years, Sites C and D, both of which incorporated active outreach and counseling, achieved significantly greater reductions in cardiovascular risk factors (44–51%) compared with Sites A and B (32–39%). In contrast, the fitness facility alone (Site B) was the costliest and least effective model. Cost-effectiveness analyses showed that Sites C and D required less than $2 per employee annually for each additional 1% reduction in risk, while Site B yielded no incremental benefit. Findings demonstrate that passive approaches, such as fitness centers or health education alone, are insufficient. The most effective and cost-efficient wellness programs combine systematic screening, personalized counseling, and supportive organizational strategies to reduce risks and sustain long-term health improvements. A utility analysis based on meta-analytic data estimated that job crafting interventions in healthcare can generate an economic benefit of approximately $2,310 per employee over a three-month period; the analysis also suggests a 14.1% increase in productivity and a

corresponding 12.36% reduction in labor costs over the same period (Oprea et al., 2019). Job crafting interventions in the Romanian healthcare sector are estimated to generate economic benefits, yielding an estimated return on investment ranging from approximately $4,030 (e.g., for beginner nurses or dental technicians) to $19,420 (e.g., for primary care physicians or dentists) per group of 10 employees, depending on specialization (Cotel et al., 2023).

Conclusion

Utility analysis proves to be a versatile tool, applicable across diverse HR practices, including personnel selection, training, performance management, and even occupational health psychology interventions. However, a Swiss survey (König et al., 2013) revealed that fewer than 10% of HR managers use utility analysis, far below earlier U.S. figures. These findings underline the limited practical diffusion of utility analysis and the ongoing gap between research and HR practice. A greater emphasis on utility analysis would allow practitioners to more effectively convey to decision-makers the economic impact and practical relevance of industrial–organizational psychology. Future research should also integrate utility analysis with the HR strategy literature to better capture how workforce investments generate value. Huselid (2023) recommends shifting focus from individual HR practices to entire HR systems, and from generic jobs to strategic jobs (those with both high impact and high performance variability), and to nonlinear returns to talent, recognizing that some roles yield increasing returns while others offer little upside.

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RESEARCH ARTICLE

Leaders' Dark Tetrad and their effectiveness in the eyes of followers: An analysis of the curvilinear relationships mediated by team members' knowledge-sharing behaviors

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Abstract

This study examined how leaders' Dark Tetrad traits - narcissism, Machiavellianism, psychopathy, and sadism - relate to perceived leadership effectiveness, and whether team members' knowledge-sharing behaviors mediate these associations. Curvilinear regression analyses conducted with a sample of 217 employees revealed that narcissism exhibited an inverted U-shaped relationship with leadership effectiveness. In contrast, Machiavellianism, psychopathy, and sadism were only negatively and linearly associated with leader effectiveness. Regarding knowledge-sharing, sadism demonstrated a significant curvilinear (U-shaped) relationship, while other traits yielded either weak or non-significant patterns. Knowledge-sharing itself followed an inverted U-shape curvilinear path in predicting leadership effectiveness. Knowledge-sharing behaviors did not mediate the relationship between Dark Tetrad traits and leadership effectiveness. These findings suggest that dark traits may display context-dependent adaptability, particularly at moderate levels, challenging traditional linear models in leadership research. They highlight the role of nonlinear dynamics in effective leadership. Limits and future directions are presented.

Keywords

Dark Tetrad, leader effectiveness, curvilinear relationship, knowledge-sharing behaviors

INTRODUCTION

Leadership effectiveness is critical in contemporary organizations operating within an increasingly volatile, uncertain, complex, and ambiguous (VUCA) environment (Mack & Khare, 2015). In such environments, effective leaders demonstrate adaptability, rapid decision-making, and the ability to maintain stability (Ruesga Rath et al., 2021). Leadership effectiveness is a multidimensional construct that pertains to the

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leader's ability to motivate, guide, and achieve successful outcomes (Chemers, 2008; Giessner & Van Knippenberg, 2007). According to this conceptualization, leadership effectiveness is assessed by how well the leader is perceived to steer the team toward its goals, inspire and motivate members, and the satisfaction members feel when working with the leader. Additionally, this approach incorporates perceptions of the leader's success in past tasks and expectations regarding their future performance, capturing both current effectiveness and potential for future success.

From a process-oriented and interactional perspective effectiveness is a dynamic interplay among multiple behavioral, relational, and contextual variables (Rost, 1993). It is not solely determined by internal competencies and the leader's psychological characteristics and dispositions (Javalagi et al., 2024; Judge et al., 2002; Silverthorne, 2001), but also by external contextual factors such as time limitations, availability of resources, subordinate engagement, and the overall quality of interpersonal dynamics within the team (Mesterova et al., 2015).

Specifically, a leader is effective to the extent that they can positively influence subordinates and organizational processes to achieve desirable results (Madanchian et al., 2017). Hence, leaders are not merely directive figures but also integral members of their teams, engaging with their followers in a shared social context (Tee, 2015). Leadership effectiveness is critical in shaping dynamics and performance within teams and organizations (Northouse, 2025).

A growing body of research has linked these behaviors to some surprising leader personality traits, such as those included into the Dark Tetrad (Ramos-Villagrasa et al., 2020). But the relationship between the Dark Tetrad personality traits and leadership effectiveness remains a subject of ongoing debate.

The Dark Tetrad extends the Dark Triad - comprising narcissism, Machiavellianism, and psychopathy - by incorporating sadism as a fourth dimension (Međedović & Petrović, 2015; Paulhus, 2014; Thibault & Kelloway, 2020). Each of these traits reflects socially aversive personality characteristics that are associated with manipulative, exploitative, and antagonistic behaviors.

Narcissism is characterized by grandiosity through tendencies toward self-perceived uniqueness, a desire for admiration, and charismatic self-presentation but its manifestation varies depending on individual personality structure and environmental influences (Fino et al., 2023). Subclinical narcissism is associated with functional, albeit manipulative, social behaviors (Paulhus & Williams, 2002). Narcissists possess high self-esteem, strategic social intelligence, and the ability to navigate social hierarchies with charm and deception (Dworkis & Young, 2023). Their narcissism is primarily instrumental, aimed at achieving power and control rather than compensating for deep-seated psychological distress (Jones & Figueredo, 2012).

Machiavellianism entails behaviors emphasizing strategic manipulation, deceit, and pragmatic goal pursuit (Brownell et al., 2023; Fino et al., 2023). High-Machiavellian individuals exhibit flexible social tactics, oscillating between cooperation and competition as needed (Czibor & Bereczkei, 2012). They engage in emotional manipulation, such as playing individuals against each other or feigning sincerity to achieve personal goals (Austin et al., 2007). Consequently, they often thrive in business and competitive environments where strategic decision-making is crucial (Kerekes, 2010).

Psychopathy, considered the "darkest" of the Dark Triad traits, entails impulsive actions, rule-breaking tendencies, and engagement in risky or antisocial behaviors (Fino et al., 2023). Those high on psychopathy are more likely to exhibit criminal activity, varying from small everyday crimes (such as opportunistic shoplifting; Lyons & Jonason, 2015) to having a chronically criminal lifestyle, leading to imprisonment and high levels of recidivism.

Sadism is characterized by the enjoyment derived from inflicting or witnessing others' suffering, both physical and emotional deriving pleasure from inflicting harm on others (Bonfá-Araujo et al., 2022; Buckels, 2012; Fino et al., 2023; Maheux-Caron et al., 2024). Everyday sadism is negatively correlated with agreeableness, honesty-

humility, and conscientiousness, reinforcing its distinctiveness from the other Dark Triad traits (Međedović & Petrović, (2015). Individuals high in everyday sadism were more likely to engage in aggressive behaviors, such as harming insects or inflicting discomfort on others, without external incentives (Buckels et al., 2013), strong engagement in violent video games (Greitemeyer, 2014) and online trolling behaviors, particularly when combined with psychopathy (Sest & March, 2017). van Geel et al. (2017) further identified sadism as a significant predictor of both traditional and cyberbullying, even when controlling the other Dark Tetrad traits.

While these traits are often linked to toxic behaviors and negative outcomes, at moderate levels they can also yield benefits under certain conditions and in specific contexts (Koehn et al., 2019; Vergauwe et al., 2021; Wille et al., 2024). When exhibited excessively or insufficiently, they can disrupt team dynamics, undermine followers' motivation, and reduce leaders' adaptability, ultimately limiting leadership effectiveness in complex contexts (Volmer et al., 2016). Considering these incongruent findings, a more nuanced approach, looking into specific mechanisms, could shed light on the dual effect Dark Tetrad traits seem to have on leadership effectiveness. Exploring how leaders' Dark Tetrad traits are linked to leadership effectiveness through behaviors exhibited by subordinates, such as knowledge-sharing behaviors, can be one such mechanism.

Knowledge-sharing behaviors are an important part of these dynamics and have a crucial role on performance in organizations (Yeboah, 2023). These behaviors are measurable and observable individual actions of exchanging information, expertise, and advice within a team context (Lee, 2018). These actions are reflected specifically through both "giving" and "asking" behaviors. "Giving" behaviors involve the active dissemination of knowledge, where individuals share their insights, strategies, lessons learned, and expertise with colleagues. This can be observed in actions such as offering advice, explaining procedures, or communicating new facts learned at work. These behaviors demonstrate an individual's willingness to contribute to the collective knowledge of the team by teaching, explaining, and providing guidance based on their professional experience and expertise. In contrast, "asking" behaviors highlight the receptive aspect of knowledge-sharing, where individuals seek information, insights, and guidance from their colleagues. This includes actions such as requesting advice, asking for explanations of procedures or strategies, and seeking insights from others based on their expertise or experience (Lee, 2018).

Knowledge-sharing behaviors significantly impact several key outcomes, such as team performance (Xiao et al., 2015) and innovation (Hu & Randel, 2014) and their effectiveness is influenced by multiple factors, including leadership. Leadership also plays a key role by modeling and incentivizing knowledge-sharing, either through formal rewards or by fostering a psychological climate conducive to information exchange (Jahani, 2011). Previous research reveals that leaders with moderate Dark Triad traits may encourage knowledge-exchange through strategic influence and control over information (Nassif, 2018). Yet their dysfunctional behaviors can also encourage knowledge-hiding and limitation of team access to information, ultimately harming long-term leadership effectiveness (Soral et al., 2022). Although existing literature has primarily focused on the influence of the Dark Triad (i.e., narcissism, Machiavellianism, psychopathy) on knowledge-hiding behaviors, limited attention was given to how knowledge-sharing behaviors might mediate the relationship between leadership traits and various outcomes. Furthermore, sadism, a central Dark Tetrad trait, is especially understudied, despite its potential to erode trust and reduce team members' willingness to share knowledge (Yin et al., 2023).

The present study approaches these gaps by exploring the inverted U-shaped curvilinear relationship between leaders' Dark Tetrad traits (i.e., narcissism, Machiavellianism, psychopathy, and sadism) and their leadership effectiveness from the perspective of their followers, mediated by

knowledge-sharing behaviors among team members.

It advances the understanding of dark personality traits in leadership by moving beyond the traditional Dark Triad framework to include sadism, a trait often overlooked despite its potential impact on organizational dynamics (Johnson et al., 2019). It provides a more comprehensive perspective on how dark traits function in leadership contexts and challenges the predominant linear perspective on the relationship between dark traits and various outcomes by proposing a curvilinear (inverted U-shaped) model in which moderate dark traits may enhance team and leadership outcomes, while extreme manifestations could undermine these outcomes (Brownell et al., 2023). Considering knowledge-sharing behaviors as a potential mechanism further contributes to leadership theories by nuancing the understanding of how dark personality traits shapes team knowledge dynamics, an area previously underexplored (Yin et al., 2023). Moreover, previous studies linking Dark Tetrad traits to leadership effectiveness have generally relied on self-reported data from leaders, which may have introduced bias and limited the reliability of conclusions drawn (Maples et al., 2014) Our research addresses this issue by looking into employee perspectives on leadership effectiveness.

Our findings are relevant for organizations operating in VUCA environments. Because leadership selection and development often rely on personality assessments, understanding how dark traits shape knowledge-sharing behaviors and leadership effectiveness enables organizations to refine their criteria and move beyond simplistic categorizations of these traits as inherently detrimental.

Hypotheses development

The relationship between Dark Tetrad traits and leadership effectiveness has been conceptualized through both linear and curvilinear models, reflecting the complex effects of these traits in organizational settings (Brownell et al., 2023).

A substantial body of research supports a linear correlation, indicating that higher levels of Dark Tetrad traits generally lead to lower leadership effectiveness. Leaders that are high in psychopathy or sadism tend to exhibit impulsivity, aggression, and a lack of empathy, which can erode trust, decrease team cohesion, and foster toxic work environments (Başar, 2020; Dierdorff & Fisher, 2021). Similarly, highly Machiavellian leaders, who prioritize manipulation and strategic deception, may struggle to build genuine relationships with their subordinates, ultimately undermining long-term organizational success (Kiazad et al., 2010; Shah et al., 2021). Excessive narcissism has also been associated with counterproductive leadership behaviors, such as grandiosity, exploitative decision-making, and an inability to accept criticism, which can lead to organizational instability (Braun, 2018). However, many of these studies have methodological limitations, including reliance on self-report measures, which can be influenced by social desirability bias (Malesza & Ostaszewski, 2015). However, leadership effectiveness is highly context-dependent, which challenges the assumption of a strictly linear relationship (Belchetz & Leithwood, 2007).

Conversely, other studies suggest that Dark Tetrad traits may contribute to leadership effectiveness in an inverted U-shaped curvilinear fashion (Allen, 2016). For example, moderate narcissism could enhance leader confidence, charisma, and strategic vision, fostering innovation and decisiveness (Vergauwe et al., 2018). Moderate Machiavellianism may enable leaders to navigate complex social dynamics, negotiate effectively, and maintain a competitive edge (Shah et al., 2021). Psychopathy, also when exhibited in moderation, has been linked to risk-taking and resilience, traits that can be advantageous in high-stakes decision-making environments (Landay et al., 2019). However, these benefits appear to diminish or become counterproductive and dysfunctional when these traits reach extreme levels, reinforcing the reversed curvilinear perspective. Sadism has been less frequently examined in both linear and curvilinear models of leadership effectiveness (Schreyer et al., 2021). So far, studies show a weaker or inconsistent relationship with leadership success compared to the other three traits (Agbim, 2024). While

sadistic leaders may engage in behaviors that undermine workplace morale and ethical standards (Thibault & Kelloway, 2020), empirical evidence supporting its impact through curvilinear patterns remains scarce (Rudden & Brandt, 2018).

In general, excessive manifestations of the Dark Tetrad traits tend to correlate with increased ethical violations, employee dissatisfaction, and organizational dysfunction (Tortoriello et al., 2019). Yet recent findings indicate that moderate expressions are associated with higher perceived leadership effectiveness, particularly in competitive or crisis-driven industries (Castagna & Hart, 2024). This paradoxical pattern underscores the importance of contextual and situational factors in determining whether these traits enhance or hinder leadership success and the need to further explore the non-linear relationship between them. Leadership theories serve as a starting point in deciphering such patterns in the Dark Triad traits.

For example, while a moderate level of narcissism can enhance leadership performance, excessive narcissism tends to undermine it. Moderate levels of narcissism are often associated with qualities such as self-confidence, strategic vision, and persuasiveness, which contribute positively to leadership effectiveness. In the Hogan Development Survey (HDS) charismatic cluster (Vergauwe et al., 2018) narcissistic traits correspond to Boldness, which fosters a leader's ability to inspire and influence others. However, as narcissism intensifies, it crosses a threshold where confidence turns into arrogance, risk-taking becomes reckless, and a leader's receptivity to feedback diminishes. This transition exemplifies the too-much-of-a-good-thing effect (TMGT; Pierce & Aguinis, 2013), which posits that traits beneficial in moderation become maladaptive when overexpressed. The versatile leadership model (Kaiser & Overfield, 2010) further clarifies this dynamic by differentiating between two leadership dimensions: forceful vs. enabling leadership and strategic vs. operational focus. A leader with moderate narcissism effectively balances these dimensions by asserting authority while remaining responsive to team dynamics. In contrast, highly narcissistic leaders become overly dominant, dismissive of dissent, and prone to exploitative behaviors, which ultimately erode trust and impair decision-making. As a result, narcissistic leaders may experience initial success but ultimately face declining effectiveness as their interpersonal deficits outweigh their strategic strengths.

A similar inverted U-shaped curvilinear relationship occurs between Machiavellianism and leadership effectiveness. According to socio-analytic theory (Hogan & Shelton, 1998), leaders high in social skills can successfully translate interpersonal aspirations into purposeful action, using political skills to navigate complex workplace dynamics (Munyon et al., 2015). At moderate levels, Machiavellian leaders demonstrate a keen understanding of organizational power structures, effective negotiation skills, and adaptive leadership behaviors, making them appear charismatic and competent. However, in line with the revised trait activation theory (Genau et al., 2021; Tett et al., 2013), the effectiveness of Machiavellianism is context-dependent, being most pronounced in environments that demand control, influence, and strategic decision-making (Smith & Webster, 2017). As Machiavellian tendencies intensify beyond an optimal point, their leadership effectiveness declines due to excessive manipulation, distrust, and unethical conduct (Kholin et al., 2019).

The inverted U-shaped pattern between psychopathy and leadership effectiveness can be understood through the trait activation framework (Tett et al., 2013) and the triarchic model of psychopathy (Patrick, 2018). As conceptualized in the triarchic model, psychopathy consists of boldness, disinhibition, and meanness (Patrick, 2018). Among these dimensions, boldness—characterized by social dominance, fearlessness, and confidence—has been linked to leadership emergence and effectiveness, particularly in high-pressure environments (Blickle et al., 2018). Leaders with moderate psychopathic traits may show higher risk tolerance, decisiveness, and resilience, boosting their perceived authority and strategic judgment. However, the **trait activation framework** suggests that certain

workplace cues can amplify the maladaptive tendencies of psychopathic leaders. Specifically, opportunities for power and financial gain activate predatory behaviors associated with meanness, leading to inconsiderate treatment of subordinates, reduced team morale, and deteriorating job performance (Blickle et al., 2018). While moderate psychopathy may be advantageous for leadership effectiveness, excessive psychopathy leads to destructive, unethical, and ultimately counterproductive leadership behaviors.

While the curvilinear relationship between sadism and leadership effectiveness has not been sufficiently explored, the functional theory of sadism (Russell, 2019) can shed some light on this pattern. It posits that the enjoyment of aggression may serve an evolutionary purpose, influencing social status and group dynamics in both constructive and destructive ways, particularly in hierarchical social structures where enforcement of norms and control over resources are necessary (Cheng et al., 2010). In leadership, sadistic tendencies may contribute to either dominance- or prestige-based strategies (Henrich & Gil-White, 2001).

Leaders low in sadism may struggle with enforcing discipline, avoiding conflict, or making difficult but necessary decisions. Their reluctance to exercise authority or impose sanctions may result in a lack of control, leading to decreased group cohesion and reduced effectiveness in maintaining organizational goals. Such leaders may strategically use punishment, discipline, or assertive confrontation to maintain order, enforce fairness, and discourage deviant behavior within their teams. In contrast, moderate levels of sadism, particularly in its prosocial form, may enhance leadership effectiveness by enabling leaders to apply aggression in a controlled and purposeful manner (Henrich & Gil-White, 2001). However, as sadistic tendencies increase beyond a certain threshold, leadership effectiveness is likely to decline. Excessively everyday sadism may lead to coercive and fear-based leadership strategies. Leaders who derive excessive pleasure from aggression risk creating a toxic work environment characterized by intimidation, emotional abuse, and interpersonal hostility. This, in turn, may lead to reduced trust, lower team morale, and higher turnover rates among subordinates (Spain et al., 2014). As such, while moderate sadism may be advantageous in leadership roles that require assertiveness and norm enforcement, excessive sadism undermines social cohesion and long-term leadership sustainability. This aligns with research showing that dark traits can benefit leadership when moderate but become harmful when extreme (Grijalva et al., 2015; Judge et al., 2009). Thus, the sadism - leadership effectiveness relationship likely also follows a curvilinear trajectory. As such, we advance the following hypothesis:

Hypothesis 1: *The relationship between the Dark Tetrad personality traits (narcissism - H1a, Machiavellianism - H1b, psychopathy – H1c, and sadism – H1d) and leader effectiveness follows a curvilinear pattern of an inverted U-shape.*

This dual-edged impact of the Dark Tetrad traits is also highlighted for specific team dynamics, such as the knowledge-sharing processes. The often manipulative, exploitative, and self-serving tendencies displayed by leaders with Dark Tetrad traits can significantly hinder team members' willingness to share knowledge. However, at moderate levels, these traits may be strategically leveraged to facilitate knowledge-sharing.

Literature provides consistent evidence for a predominantly *negative linear relationship* between leaders' Dark Tetrad traits and knowledge-sharing behaviors in teams. These personality traits are linked to manipulative, exploitative, and antagonistic interpersonal styles, which tend to erode the psychological safety required for open communication within teams (O'Boyle et al., 2013). Leaders high in Machiavellianism are prone to strategically withhold or distort information to maintain power asymmetries, thereby obstructing the free flow of knowledge among subordinates (Huang et al., 2023). Psychopathic traits, characterized by impulsivity, lack of empathy, and interpersonal coldness, undermine trust and collaborative dynamics, discouraging

employees from engaging in reciprocal information exchange (Dargis et al., 2018). Although narcissistic leaders may initially appear charismatic and visionary, their tendency toward self-centeredness and status-seeking can shift the focus away from collective knowledge development toward personal validation (Liu et al., 2021; Nevicka et al., 2018; Tahir et al., 2023). Sadistic leadership can further deteriorate the team climate, instilling fear and punitive norms that directly inhibit knowledge-sharing behaviors (Torralba et al., 2020). In such contexts, team members are less likely to share ideas, offer feedback, or collaborate openly, perceiving such acts as potential sources of vulnerability or exploitation.

On the other hand, a few recent studies suggest that at moderate levels, these traits may facilitate knowledge-sharing, whereas at extreme levels, they become detrimental. Brownell et al. (2023) provides empirical support for a *curvilinear relationship* between founder Machiavellianism, psychopathy, and new venture performance, with knowledge-sharing serving as a key explanatory mechanism. Moderate Machiavellianism and psychopathy might enable strategic knowledge management, facilitating controlled information-exchange to optimize team performance. They found that, contrary to expectations, narcissism exhibited a positive linear relationship with performance, indicating that narcissistic founders may leverage their confidence and vision to sustain knowledge-sharing and organizational success. Yet, at excessive levels, these traits likely erode trust and psychological safety, leading to knowledge-hoarding and reduced collaboration (Bouncken et al., 2020).

Additionally, building on the self-regulation theory (Mithaug, 1993), knowledge-sharing is not merely inhibited or facilitated by the leaders' dark traits in a linear fashion, but this varies based on contextual factors and the intensity of these traits. Moreover, the curvilinear effect is influenced by contextual moderators such as duration of leader-follower interaction and situational pressures (Xia et al., 2019).

Considering the tenets of the charismatic leadership theory (Conger & Kanungo, 1998), low to moderate narcissism can enhance knowledge-sharing by fostering a compelling vision and confidence, motivating employees to engage in discussions and contribute ideas (Tahir et al., 2023; Wang et al., 2023). Likewise, moderate Machiavellianism may lead to strategic knowledge-dissemination, ensuring efficient information flow within teams. In situations of crisis or ambiguity, such leaders might display charismatic leadership, driving knowledge-sharing efforts to address urgent organizational challenges (Shah et al., 2021). However, as these traits intensify, the relationship reverses and, over time, the harmful traits typically dominate, reducing psychological safety and hindering knowledge-sharing (Shao et al., 2016; Yin et al., 2023). Highly narcissistic leaders may suppress team contributions, prioritizing their self-image over collective success (Xiao et al., 2018). Machiavellian leaders may manipulate knowledge-flow, creating an environment of distrust and secrecy where employees withhold information to protect themselves (Serenko & Choo, 2020). Psychopathy and sadism further deteriorate knowledge-sharing climates by fostering hostile, punitive environments that discourage open communication (Yin et al., 2023).

Considering these, it is plausible that leaders with Dark Tetrad traits exhibit a curvilinear effect on knowledge-sharing among followers. Thus, we advance that:

Hypothesis 2: *The relationship between the Dark Tetrad personality traits (narcissism – H2a, Machiavellianism – H2b, psychopathy – H2c, and sadism – H2d) and knowledge-sharing behaviors among team members follows a curvilinear pattern of an inverted U-shape*.

Knowledge-sharing is fundamental not only to team functioning and innovation but also to the perceived and actual effectiveness of leadership (Wang & Wang, 2012). This is, to a significant extent, shaped by the social and informational dynamics within the team, particularly the extent to which knowledge is openly communicated, distributed, and integrated.

Effective leaders are often those who succeed in cultivating a climate of trust, openness, and psychological safety—conditions that are prerequisites for knowledge-sharing behaviors (Edmondson, 1999). When team members feel secure and supported in contributing their knowledge, they are more likely to engage in collaborative problem-solving, provide constructive feedback, and coordinate efforts (Nelson, 2013). These behaviors, in turn, enhance the leader's capacity to access relevant information, align team actions with organizational goals, and respond adaptively to challenges. In this way, knowledge-sharing facilitates better decision-making and strategic foresight, thereby reinforcing perceptions of leadership competence and credibility (Kim et al., 2021). Moreover, knowledge-sharing behaviors contribute to the development of high-quality leader–member exchanges, characterized by mutual trust, respect, and reciprocity (Graen & Uhl-Bien, 1995). In teams where knowledge flows freely, leaders are more attuned to the needs, skills, and perspectives of their subordinates (MacGillivray, 2018). This relational attunement allows leaders to provide more targeted support, delegate effectively, and manage team dynamics constructively — core components of leadership effectiveness (Svensson & Wood, 2006).

Conversely, a lack of knowledge-sharing can impair leadership effectiveness by limiting access to critical insights, reducing situational awareness, and fostering fragmented team functioning (Burmeister et al., 2018). When team members do not engage in knowledge-sharing behaviors, leaders may struggle to coordinate collective efforts or to detect early warning signs of conflict, burnout, or inefficiency, thereby weakening their capacity to lead effectively (Choudhary & Mishra, 2021). In such contexts, leaders may be perceived as disconnected, authoritarian, or reactive rather than proactive (Zhao et al., 2019).

Hence, while evidence shows that moderate levels of knowledge-sharing are conducive to leadership effectiveness, excessive or unregulated information flow can become detrimental (Arnold et al., 2023) suggesting that the relationship between them may also follow a curvilinear pattern. According to cognitive load theory (Miller, 1956; Sweller, 1988), the human cognitive system (the working memory) has limited capacity to process and integrate large volumes of information simultaneously. **S**everal studies suggest that information initially enhances performance, but beyond a critical threshold, excessive information becomes detrimental (Eppler & Mengis, 2004; Klausegger et al., 2007). When the volume or complexity of information surpasses this threshold, *information overload* occurs - leading to difficulties in integration, prioritization, and strategic decision-making (Graf & Antoni, 2020). Knowledge-sharing behaviors that are initially functional can become counterproductive if they contribute to cognitive saturation.

In team contexts, this implies that moderate knowledge-sharing enhances the leader's awareness and decision quality, but excessive knowledge flow can overwhelm the leader, resulting in mental fatigue, indecision, and fragmentation of authority (McDowall, 2022). Leaders may find it increasingly difficult to distinguish relevant from irrelevant data, prioritize tasks and delegate efficiently, or maintain a coherent vision and situational awareness. This is especially noticeable in digital work environments, where the overuse of Information and Communication Technologies (Ragu-Nathan et al., 2008) can diminish a leader's cognitive and emotional bandwidth, ultimately constraining their capacity to guide, inspire, and regulate team dynamics (Estrada-Muñoz et al., 2022). We therefore hypothesize that:

Hypothesis 3: *The relationship between knowledge-sharing behaviors among team members and leader effectiveness follows a curvilinear pattern of inverted U-shape.*

Charismatic leadership theory (Conger & Kanungo, 1998) explains how leaders with moderate dark traits can positively influence knowledge-sharing and thereby enhance leadership effectiveness. Charismatic leaders engage followers through extraordinary behaviors, including articulating a compelling vision, taking personal risks, demonstrating empathy, and exhibiting unconventional

actions. Thus, leaders with moderate narcissism, Machiavellianism, psychopathy, and sadism may display charismatic behaviors that promote knowledge-sharing within teams. For example, moderate narcissism can inspire a grand vision that mobilizes the team (Schmid et al., 2021); moderate psychopathy encourages calculated risk-taking, fostering motivation (Prusik & Szulawski, 2019); moderate Machiavellianism supports strategic, empathy-simulating behavior to sustain collaboration (Gruda et al., 2023), and controlled sadism can drive creative problem-solving (Bhattacharjee & Tripathi, 2024). These leaders are thus perceived as exceptional, responding effectively to organizational demands and stimulating collaboration. Such charismatic behaviors could mediate the relationship between dark traits and perceived leadership effectiveness, ultimately improving team performance.

Furthermore, charismatic leadership shapes followers' engagement and interactions by fostering trust, motivation, and a shared vision, which creates a psychologically safe environment conducive to knowledge-sharing. Addressing emotional and symbolic needs, these leaders strengthen group cohesion and openness. However, when dark traits surpass moderate levels, charismatic behaviors lose efficacy and can harm knowledge-sharing. The organizational context, such as crises or VUCA environments, can also amplify or mitigate these effects. Hence our final hypothesis is that:

Hypothesis 4: *The curvilinear pattern of an inverted U-shape relationship between the Dark Tetrad personality traits (narcissism - H4a, Machiavellianism - H4b, psychopathy - H4c, and sadism - H4d) and leader effectiveness is mediated by team members' knowledge-sharing behaviors.*

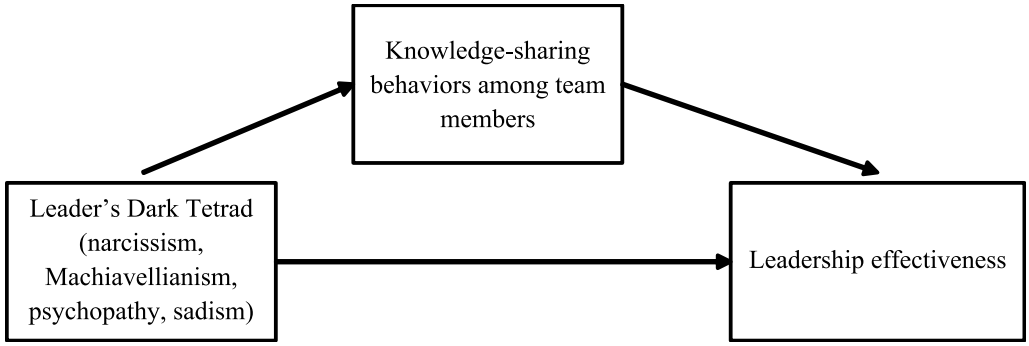

Figure 1. Research model with inverted U-shaped relationships.

METHOD

Participants

To ensure adequate power for detecting both direct and indirect effects (a minimum of .80), we utilized Fritz and MacKinnon's (2007) sample size estimation method, which is tailored for mediation models. Specifically, we selected a small-medium effect size of .234 based on relevant literature for a *path* (leader's dark personality traits to knowledge-sharing behaviors among team members) (Karim, 2022). The cited study investigated the relationship between dark traits and knowledge-hiding behaviors and although from a different context, this effect size can be reasonably applied, assuming the knowledge-sharing and knowledge-hiding behaviors are situated on a continuum (Connelly et al., 2011).

For the *b path* (knowledge-sharing behaviors among team members to leadership effectiveness), we applied a small-medium effect size of .219 based on Alkheyi et al. (2020). Other studies investigating the

relationship between knowledge-sharing behaviors and innovation reported similar effect sizes ranging from .125 to .291 (Aydin & Erkiliç, 2020).

We found that no specific effect size for the path between knowledge-sharing behaviors and leadership effectiveness is available. Although from a different context, this effect size can be reasonably applied, assuming the relationship is similar. We chose a τ' *value* of .14 for our sample size estimation based on the expectations for the direct effect of the predictor (dark triad traits) on the outcome (leadership effectiveness) in the presence of the mediator (knowledge-sharing behaviors). This value aligns with previous research, which suggests that the relationship between the dark triad traits and leadership effectiveness, when mediated by knowledge-sharing behaviors, is moderate but not overly large (Aydin & Erkiliç, 2020).

Considering these values, the required sample size is 224 participants.

The sample consisted of N = 217 employees nested in teams (70.6% females). Participants' ages ranged from 19 to 64 years (M = 39.03, SD = 12.23). In terms of education, 17% had graduated from high school, 16.1% graduated from a post-secondary school (non-tertiary), 45.9% held a bachelor's degree, 18.3% a master's degree, and the other 2.7% completed other studies as their last form of graduation (e.g. PhD, college, vocational school, or even high school program).

On average, participants had 10.61 years of experience in their current organization (SD = 10.72), including 9.22 years in their current role (SD = 10.03), 8.53 years within their current team (SD = 9.81), and 5.94 years under their current team leader (SD = 6.55). Teams had an average of 25 members.

Most of our sample (87.2%) worked full-time, across a variety of professional domains, including medical (56.6%), administrative (13%), tech (10%), commerce (7%), social (5%), finance (3%), HR (3%) and education (3%).

Instruments

Data was collected using a quantitative, non-experimental, cross-sectional correlational design.

To measure leaders' dark traits, we adapted the Romanian version of the Short Dark Triad (SD4) Scale (Jones & Paulhus, 2014; Fino et al., 2023) to assess followers' perceptions of their leader's dark traits, including Machiavellianism ("*My leader believes that it is unwise to share their secrets with others*"; α = .76) narcissism (*"From time to time, my leader enjoys standing out";* α = .88*)*, psychopathy (*"People say that my leader is out of control"; α* = .90), and sadism (*"My leader enjoys watching violent sports" (α* = .92*).* Participants used a 5-point Likert scale, ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree") to provide their answers.

We used the Perceived Leadership Effectiveness Scale (Knippenberg & van Knippenberg, 2005) to assess the effectiveness of leaders based on team members' perceptions. It captures various dimensions of leadership effectiveness, including task accomplishment, motivation, and overall satisfaction. An item example is *"This team leader is a good leader" (α = .96)*. Participants evaluated their leader's effectiveness on a 7-point Likert scale, ranging from 1 (*"Strongly Disagree"* or *"Not successful"*) to 7 (*"Strongly Agree"* or *"Very successful"*).

The Knowledge-Sharing Behavior Scale **(**Lee, 2018) assesses two dimensions of knowledge-sharing: knowledge-"giving" (*"I impart lessons that I have learned to colleagues"*) and knowledge-"asking" (*"I ask colleagues for their expertise"*), each captured through 16 items. The participants provided their answers on a 6-point Likert scale, from 1 (*"Never"*) to 6 (*"Always"*). We considered the global score of this scale (*α* = .97).

The following variables were controls: participants' age, gender, level of education, tenure in the organization, job tenure, tenure within their current team, and duration of collaboration with their current team leader, team size, employment type (full-time or part-time), and whether participants hold a leadership role (yes/no).

Procedure

Participants were recruited through online platforms using Google Forms. Upon agreeing to participate, they signed an electronic informed consent form detailing the study's purpose, duration, data anonymity and confidentiality, as well as their right to withdraw at any time without any negative repercussions. Subsequently, participants completed the survey.

To ensure data security, all responses were anonymized and stored on a secure online server accessible only to the research team. Responses were checked for completeness and used exclusively for research.

Data analysis

Descriptive analysis (mean, standard deviation, minimum and maximum) was followed by the hierarchical regression analysis to test the proposed inverted U-shape relationships. Following recommendations from the literature (Haans et al., 2016), all main predictors involved in the first three tested hypotheses were mean-centered prior to their inclusion in the regression analyses. Centering was performed by subtracting the sample mean from each individual global score to reduce multicollinearity between linear and higher-order terms and to facilitate interpretation of the regression coefficients. Next, a quadratic term was created based on the centered predictor (X^2). This quadratic term was calculated by squaring the centered predictor scores rather than raw scores, ensuring statistical validity and minimizing artifacts. Consequently, all curvilinear regression models included both the centered predictor and its corresponding centered quadratic term (Iacobucci et al., 2015).

The steps involved in conducting the hierarchical regression analysis were: (1). control variables - including age, gender, level of education, tenure in the organization, job tenure, tenure within their current team, and duration of collaboration with their current team leader; (2). centered main predictor; (3). the squared term of the centered main predictor.

To test Hypothesis H4, we used the MEDCURVE macro (Hayes & Preacher, 2010) in IBM SPSS v.25. This macro allows us to explore and quantify indirect effects of knowledge-sharing in the proposed inverted U-shaped relationships between leader Dark Tetrad and leadership effectiveness.

RESULTS

Descriptive statistics

Results of the descriptive analysis are included in Table 1.

Table 1. *Descriptive statistics for main variables (N = 217)*

Variable	M	SD	Min	Max
Knowledge-sharing behaviors	4.43	.64	1.66	5.00
Machiavellianism	2.70	.81	1.00	5.00
Narcissism	2.88	.93	1.00	5.00
Psychopathy	1.82	.93	1.00	5.00
Sadism	1.52	.85	1.00	5.00
Leadership Effectiveness	5.35	1.34	1.00	7.00

When testing the inverted U-shaped relationship between narcissism and leader effectiveness (H1a), our results revealed that controls yield a non-significant model (R^2 = .044, p = .495). In the second step, the centered narcissism variable significantly explained the variance of leadership effectiveness (ΔR^2 = .054, p = .001). In the third step, the squared term of the centered narcissism variable further increased the explained variance (ΔR^2 = .088, p < .001). Both the linear term (β = 1.130, p < .001) and the quadratic term (β = -1.403, p < .001) were statistically significant and in the expected directions. This combination (a positive β for the linear term and a negative β for the squared term) clearly supports an inverted U-shaped curvilinear relationship: at moderate levels of narcissism, leader effectiveness is higher, but it decreases

at high and low levels. *These results support the hypothesized inverted U-shaped relationship between narcissism and leader effectiveness*.

The hypothesized inverted U-shaped relationship between Machiavellianism and leader effectiveness (H1b) was not supported by the data. In the first step, control variables yield a non-significant model (R^2 = .044, p = .495). In the second step, the centered Machiavellianism variable significantly explained variance (ΔR^2 = .086, p < .001). In the third step, the squared term of the centered Machiavellianism did not significantly explain additional variance (ΔR^2 = = .006, p =.231). The linear term was significant and negative (β = − .278, p < .001), whereas the quadratic term was non-significant (β = −.082, p = .231). *This pattern indicates the existence of a negative linear relationship between Machiavellianism and leader effectiveness.*

Our data reveal that the *relationship between psychopathy and leader effectiveness does not follow a curvilinear pattern of an inverted U-shape (H1c)*. The relationship between psychopathy and leader effectiveness appears to be linear and negative rather than curvilinear inverted U-shaped. In Step 1, controls generated a non-significant model (R^2 = .044, p = .495). In Step 2, the centered psychopathy variable increased the explained variance, ΔR^2 =.262, with the model explaining 30.6% of variance in leader effectiveness (R = .553, R^2 = .306, adjusted R^2 = .268, F (11,204) = 8.162, p < .001). The linear effect of psychopathy was significantly negative (β = −.529, p < .001). In Step 3, the squared term of centered psychopathy did not significantly improve the model (ΔR^2 = .003, F (1,203) = .874, p = .351). Neither the linear term (β = −.280, t = −1.026, p = .306), nor the quadratic term (β = −.253, t = −.935, p = .351) were statistically significant in this final model.

The inverted U-shaped relationship between sadism and leader effectiveness (H1d) was not empirically supported. In the first step, control variables did not significantly predict leader effectiveness (R^2 = .044, F(10, 205) = .94, p = .495). In the second step, the centered sadism variable explained additional variance (ΔR^2 = .129, ΔF(1, 204) = 31.72, p < .001). The linear term was statistically significant and negative (β = *-.368, t* = *-5.63, p* < .001), indicating that higher sadism was associated with lower perceived leader effectiveness. In the third step, the squared term of the centered sadism variable yielded a non-significant increase in explained variance (ΔR^2 = .006, ΔF(1, 203) = 1.46, p = .228) and was not statistically significant (β = -.372, t = -1.21, p = .228).

Figure 2 presents the regression slopes depicting the relationships between each of the Dark Tetrad traits and perceived leader effectiveness.

The curvilinear (inverted U-shaped) relationship between narcissism and knowledge-sharing behaviors was not empirically supported (H2a). In the first step, control variables explained 15.8% of the variance in knowledge-sharing behaviors (F(10, 205) = 3.85, p < .001). Age was a significant positive predictor (B = .015, p = .002). Adding the centered narcissism variable in the second step did not significantly improve the model (ΔR^2 = .000, p = .927). However, when including the quadratic term in the third step, the explained variance increased marginally to 17.3%, ΔR^2 = .015, p = .057, approaching significance. The coefficients for the quadratic term were negative (B = -.067, p = .057), consistent with an inverted U-shaped pattern, though this effect was marginally significant. The linear term was positive but also marginally significant (B = .390, p = .061).

Our data does not support a curvilinear pattern of inverted U-shape between Machiavellianism and knowledge-sharing behaviors among team members follows (H2b). After testing the first model in the hierarchical regression, the centered variable in Model 2 does not significantly improve the model fit (ΔR^2 = .001, F_{change}(1, 204) = .23, p = .63). Machiavellianism was not a significant linear predictor (B = -.025, SE = .052, β = -.03, p = .63). The quadratic term of Machiavellianism did not significantly improve model fit (ΔR^2 = .000, F_{change}(1, 203) = 0.03, p = .86), and was not statistically significant (B = -.007, SE = .041, β = -.01, p = .86).

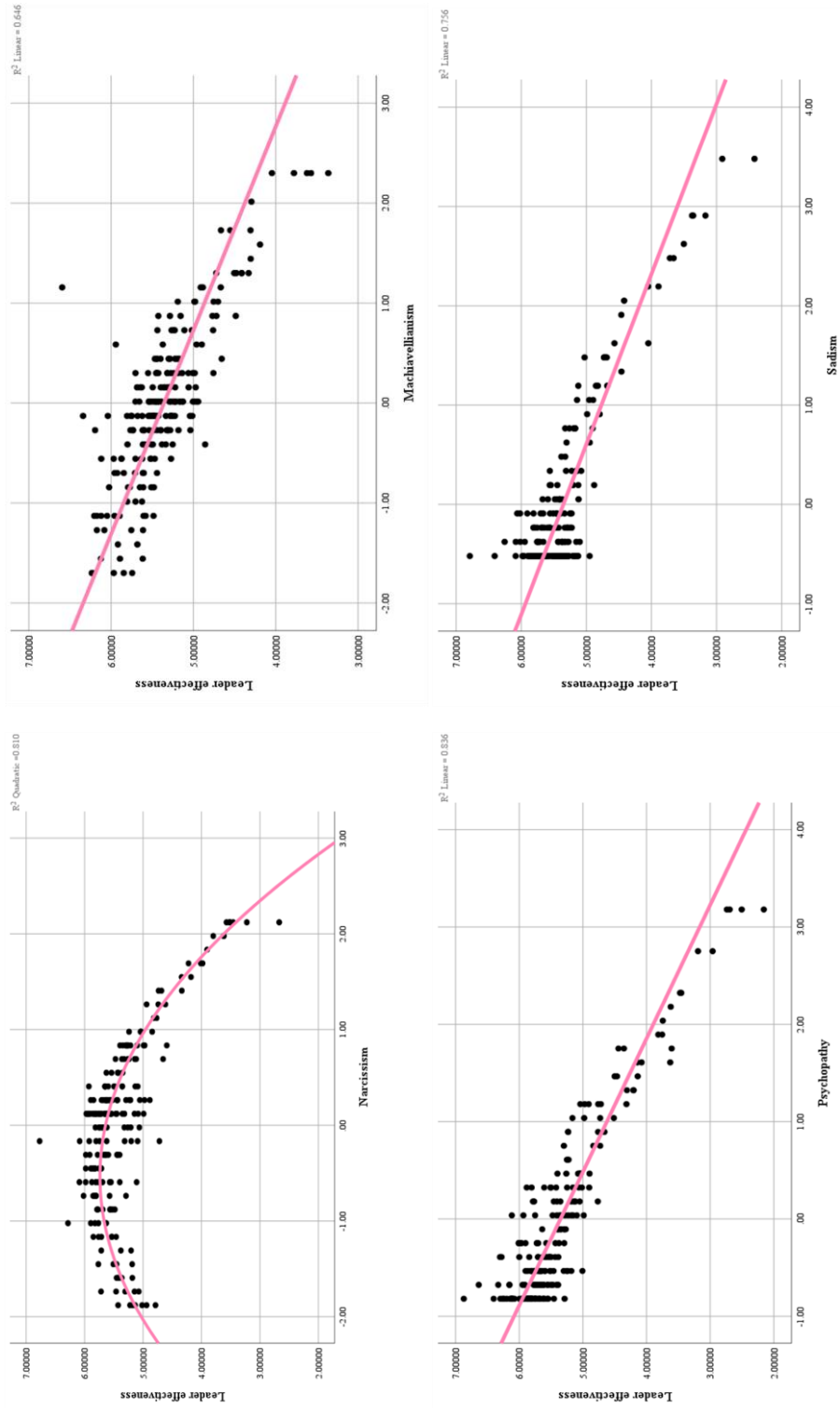

Figure 2. Quadratic and linear relationships between Dark Tetrad and perceived leader effectiveness.
Note. Centered values were used for dark personality traits.

Similar non-significant results were found on t*he inverted U-shape relationship between psychopathy and knowledge-sharing behaviors among team members follows (H2c).* After testing the first model in the hierarchical regression, we added the linear term for psychopathy in the second step. Psychopathy did not significantly explain knowledge-sharing ($\Delta R^2 = .007$, $F(1, 204) = 1.68$, $p = .196$). In the third step, the quadratic term did not significantly increase explained variance ($\Delta R^2 = .008$, $F(1, 203) = 1.99$, $p = .160$), and was not statistically significant (B = .056, $SE = .039$, $\beta = .42$, $t = 1.41$, $p = .160$). The linear term of psychopathy was also nonsignificant ($B = -.34$, $SE = .20$, $\beta = -.50$, $t = -1.66$, $p = .098$).

T*he relationship between sadism and knowledge-sharing behaviors among team members does not follow a curvilinear pattern of inverted U-shape (H2d).* The linear term of sadism led to a non-significant increase in explained variance ($\Delta R^2 = .013$, $F(1, 204) = 3.258$, $p = .073$). Including the quadratic sadism term significantly improved the model ($\Delta R^2 = .020$, $F(1, 203) = 5.103$, $p = .025$), with the full model explaining 19.2% of the variance, ($R^2 = .192$, $F(12, 203) = 4.012$, $p < .001$). In the final step, the linear sadism coefficient was significant and negative ($B = -.602$, $\beta = -.794$, $t = -2.594$, $p = .010$), while the quadratic sadism coefficient was significant and positive ($B = .106$, $\beta = .690$, $t = 2.259$, $p = .025$). This pattern supports a curvilinear relationship consistent with a U-shape between sadism and knowledge-sharing behaviors: knowledge-sharing behavior increases at low levels of sadism, decreases at moderate levels of sadism, and then increasing again at higher level of sadism, suggesting an unexpected complexity in how sadistic traits relate to team knowledge-sharing.

Figure 3 presents the regression slopes depicting the relationships between each of the Dark Tetrad traits and knowledge-sharing behaviors.

Results revealed that the *relationship between knowledge-sharing behaviors among team members and leader effectiveness follows an inverted U-shaped pattern (H3).* The model including only control variables was not significant ($F(10, 205) = .94$, $p = .495$), explaining 4.4% of the variance in leader effectiveness. Adding the centered predictor in Step 2 significantly improved the model ($\Delta R^2 = .05$, $F_{change}(1, 204) = 12.09$, $p = .001$). In Step 3, the squared knowledge-sharing term further improved model fit ($\Delta R^2 = .02$, $F_{change}(1, 203) = 5.20$, $p = .024$), resulting in a final model that explained 12.0% of the variance ($F(12, 203) = 2.31$, $p = .009$). The quadratic term was significant and negative ($B = -.361$, $SE = .158$, $\beta = -.217$, $p = .024$), while the linear term was not significant ($B = .187$, $SE = .212$, $\beta = .089$, $p = .378$).

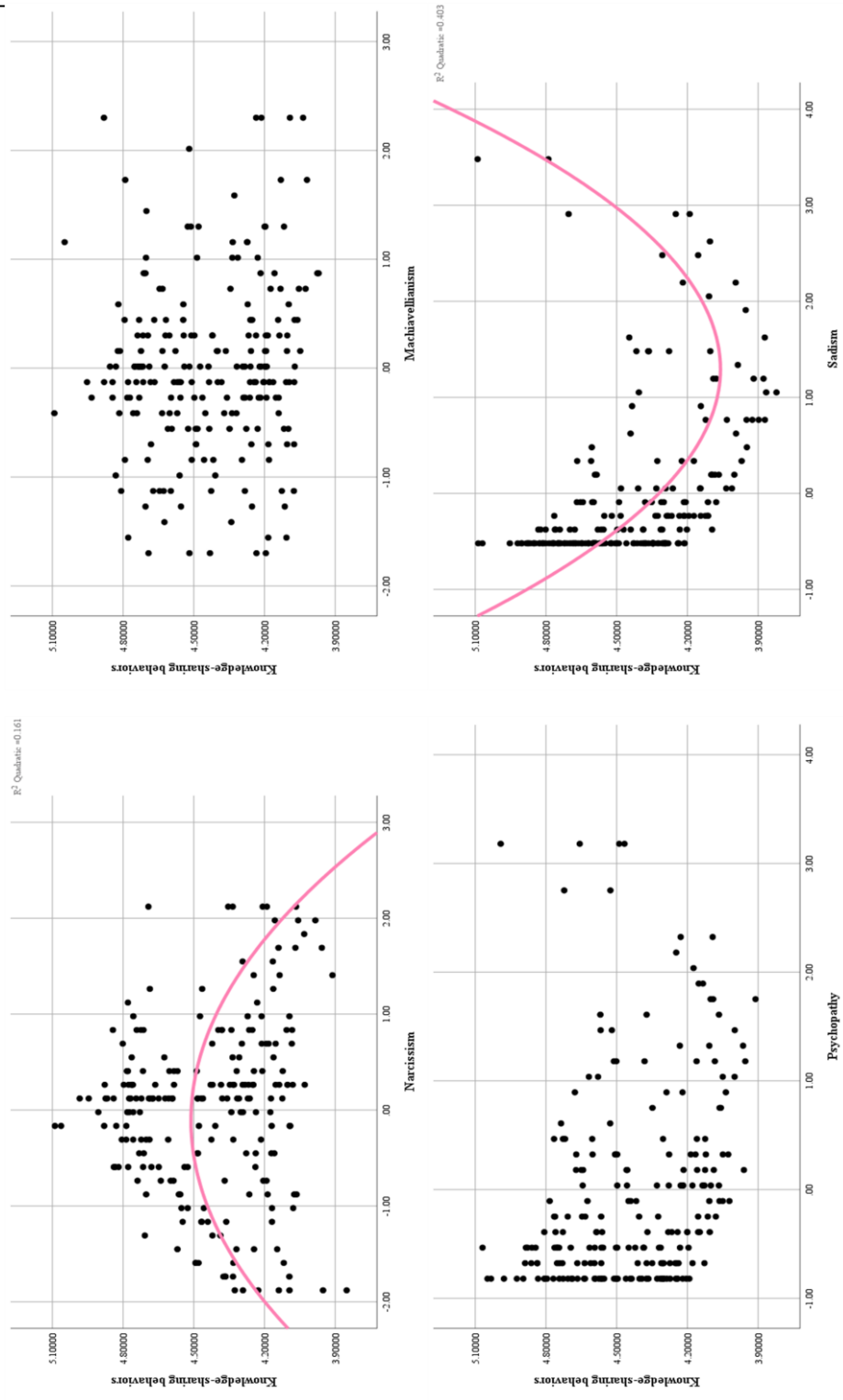

Figure 3. Quadratic relationship between Dark Tetrad and knowledge-sharing behaviors.
Note. Centered values were used for dark personality traits.

Figure 4 presents the regression slopes depicting the relationships between knowledge-sharing behaviors and leadership effectiveness.

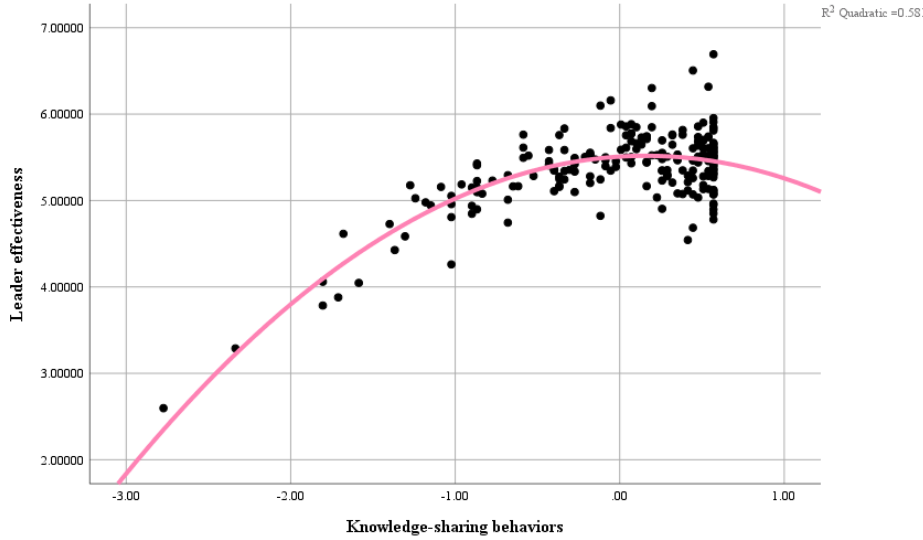

Figure 4. Quadratic relationship between knowledge-sharing behaviors and leader effectiveness. *Note.* Centered values were used for knowledge-sharing behaviors. R^2 (Quadratic) = .581.

We found that *knowledge-sharing behaviors were not a mediator in the inverted U-shaped relationship between narcissism and leader effectiveness (H4a)* although there was an inverted U-shaped relationship between narcissism and leader effectiveness (as indicated by significant positive linear (b = 1.23, p = .005) and negative quadratic effects of narcissism (b = –.28, p < .001) on leader effectiveness) and knowledge-sharing behaviors had a curvilinear effect on leader effectiveness (linear: b = 3.08, p = .012; quadratic: b = –.33, p = .031). Narcissism showed a marginally significant inverted U-shaped effect on knowledge-sharing (linear: b = .39, p = .061; quadratic: b = –.07, p = .057). However, the mediation analysis revealed that the indirect effect of narcissism on leader effectiveness via knowledge-sharing was not statistically significant at low (95% CI [–.03, .12]), mean (95% CI [–.03, .03]), or high (95% CI [–.12, .03]) levels of narcissism, as confidence intervals included zero. These findings suggest that while narcissism and knowledge-sharing each relate curvilinearly to leader effectiveness, knowledge-sharing does not significantly mediate this relationship.

Our data does not support Hypothesis H4b that the inverted U-shaped relationship between Machiavellianism and leader effectiveness is mediated by team members' knowledge-sharing behaviors. Results indicated that Machiavellianism (both linear and quadratic terms) did not significantly predict knowledge-sharing behaviors (b = .017, p = .943; b = –.007, p = .859, respectively). Knowledge-sharing behaviors exhibited a significant curvilinear relationship with leader effectiveness, with a positive linear term (b = 3.77, p = .002) and a negative quadratic term (b = –.41, p = .008), indicating an inverted U-shape. Bootstrapped indirect effects were not statistically significant at the mean or ±1 SD of Machiavellianism.

The hypothesized inverted U-shaped relationship between psychopathy and leader effectiveness mediated by knowledge-sharing behaviors was not empirically supported (H4c). Knowledge-sharing was not statistically significant predicted by either the linear (b = –.34, p = .098) or quadratic term of psychopathy (b = .06, p = .160). However, knowledge-sharing had a significant inverted U-shaped relationship with leader

effectiveness, with a positive linear effect ($b = 4.02$, $p < .001$) and a significant negative quadratic effect ($b = –.45$, p = .001). The direct effects of psychopathy on leader effectiveness were non-significant for both linear ($b = –.45$, $p = .241$) and quadratic terms ($b = –.06$, $p = .399$). The mediation analysis showed non-significant instantaneous indirect effects of psychopathy on leader effectiveness via knowledge-sharing across low, mean, and high levels of psychopathy, with all 95% bootstrap confidence intervals including zero. Thus, while knowledge sharing strongly predicts leader effectiveness in an inverted U-shaped pattern, knowledge-sharing does not significantly mediate the relationship between psychopathy and leader effectiveness.

Our data does not support the mediator role of knowledge-sharing behaviors in the inverted U-shaped relationship between sadism and leader effectiveness (H4d). The quadratic effect of sadism on the mediator, knowledge-sharing, was significant and positive ($b = .11$, $p = .025$), while the linear effect was significant and negative ($b = –.60$, $p = .010$), indicating a curvilinear relationship between sadism and knowledge-sharing in the form of U. In turn, knowledge-sharing showed a significant inverted U-shaped association with leader effectiveness, evidenced by a significant positive linear effect ($b = 3.68$, $p = .002$) and a significant negative quadratic effect ($b = -.41$, $p = .007$). The direct effects of sadism on leader effectiveness were not statistically significant for either the linear ($b = .06$, $p = .899$) or the quadratic terms ($b = –.13$, $p = .183$). Mediation analyses indicated that the instantaneous indirect effects of sadism on leader effectiveness through knowledge-sharing were not statistically significant at low, mean, or high levels of sadism.

DISCUSSIONS

This study examined the U-inverted shape relationships between leaders' dark personality traits - narcissism, Machiavellianism, psychopathy, and sadism - and leadership effectiveness. Additionally, it explored whether knowledge-sharing behaviors among team members mediate these relationships.

Our data provides partial support for the proposed inverted U-shaped relationships between Dark Tetrad traits and leader effectiveness.

Specifically, they indicate a curvilinear relationship between narcissism and leader effectiveness. This pattern aligns with previous research which suggests, on the one hand, that moderate narcissism levels, associated with increased self-confidence, vision, and assertiveness may enhance perceptions of leadership effectiveness (Schmid et al., 2021). On the other hand, excessive narcissism appears detrimental, potentially due to overconfidence, exploitation of others, and impaired decision-making (O'Reilly & Hall, 2020). This supports the "too much of a good thing" effect (TMGT; Pierce & Aguinis, 2013), wherein beneficial traits become counterproductive beyond a certain threshold.

In contrast, no significant quadratic effects were observed for Machiavellianism, psychopathy, or sadism. For Machiavellianism, the significant negative linear association suggests that higher levels of manipulation and strategic deception are consistently perceived by followers as harmful for leader effectiveness. These finding echoes prior evidence that Machiavellian leaders may erode trust and reduce team cohesion (Michel, 2024). Similarly, psychopathy had a significant negative linear effect, which is in line with past studies indicating that callousness and impulsivity undermine interpersonal functioning and leadership outcomes (Aprillia & Maharani, 2021). The lack of a curvilinear trend suggests that even low to moderate levels of psychopathy may not offer the adaptive advantages in high-stakes leadership contexts (Vergauwe et al., 2021). For sadism, our results indicated a negative linear trend consistent with research showing that leaders high in sadistic tendencies may engage in hostile behaviors that damage morale and performance (Buckels et al., 2013).

Taken together, these findings underscore the complexity of dark personality traits in

leadership roles. While moderate narcissism may facilitate leader emergence and perceived competence, the remaining traits of the Dark Tetrad appear to exert uniformly negative effects on perceived leader effectiveness, thereby challenging the notion that these traits may have adaptive or strategic value in leadership when present in moderation.

Our second hypothesis explored the inverted U-shaped relationships between the leaders' Dark Tetrad traits and knowledge-sharing behaviors among team members. The relationship between narcissism and knowledge-sharing was marginally curvilinear in the expected inverted U-shape. This suggests that individuals with moderate narcissism might be more motivated to share knowledge, potentially due to a desire for recognition and influence (Owens et al., 2015). However, a strong narcissistic self-enhancement and entitlement may suppress collaboration (Shukla & Upadhyay, 2025), which could inhibit knowledge-sharing. Although the quadratic effect approached significance, the findings imply a tentative trend that warrants further exploration in larger or more diverse samples.

Conversely, no significant linear or curvilinear relationships were observed between Machiavellianism or psychopathy and knowledge-sharing behaviors. These findings align with research indicating that highly Machiavellian individuals tend to hoard knowledge for strategic gain and self-protection (Sendjaya et al., 2016), while psychopathic traits, often linked to low empathy and manipulativeness, may diminish interpersonal trust and cooperative engagement (Shukla & Upadhyay, 2025) and, thus, effectively disrupt knowledge-sharing processes. The lack of curvilinearity suggests that even moderate levels of these traits may not lead to adaptive engagement in knowledge-sharing.

Unexpectedly, our data revealed a significant U-shaped (and not inverted as expected) relationship between sadism and knowledge-sharing (H2d). Specifically, individuals high and low in sadism were more likely to share knowledge, whereas those at moderate levels shared the least. This paradoxical result could reflect different sadistic motivations: while low-sadism individuals may share out of prosocial intent, those high in sadism may engage in strategic or even manipulative sharing as a form of control or subtle domination (Góis et al., 2019). This finding suggests that sadism's role in team dynamics may be more complex than previously assumed.

Our findings indicate that older participants were more willing to share knowledge. Consistent with prior research, greater professional experience, interpersonal skills, and a stronger sense of collective responsibility among older individuals may promote more collaborative knowledge-sharing behaviors (Crandall et al., 2022).

Our data revealed an inverted U-shaped curvilinear relationship between knowledge-sharing behaviors among team members and perceived leader effectiveness. Thus, moderate levels of team knowledge-sharing were associated with the highest perceptions of leader effectiveness, whereas both low and high levels were linked to lower ratings. This pattern is theoretically consistent with the Goldilocks and TMG principles (i.e., "too little" or "too much" can be suboptimal) and aligns with others suggesting that excessive knowledge-sharing can lead to information overload, decision paralysis, or even perceptions of inefficiency or micromanagement (Eppler & Mengis, 2004). Too little sharing may, in turn, hinder collaboration, alignment, and innovation, reflecting negatively on a leader's capacity to foster productive teamwork (Srivastava et al., 2006). The observed curvilinear effect underscores the importance of balance in team knowledge processes and suggests that leader effectiveness is highest when teams share knowledge purposefully and selectively rather than indiscriminately.

The mediation pathways were not statistically significant for any of the four traits (Hypothesis 4). One explanation for this may lie in the dual nature of Dark Tetrad traits, which often generate ambivalent or contradictory social effects that are difficult to transmit through a single group-level mechanism like knowledge-sharing. For instance, moderate levels of narcissism may boost interpersonal charm and confidence (Back et al., 2013), positively influencing both leader ratings and openness in the team, but

higher levels may generate relational toxicity, distrust, or dominance behaviors that suppress collaborative exchanges (Grijalva & Harms, 2014). This shift in valence across trait levels may create nonlinear direct effects on leader effectiveness that are not fully captured by the more stable, behaviorally grounded process of knowledge-sharing, which depends on team cohesion and psychological safety (Edmondson, 1999).

Moreover, knowledge-sharing behaviors are collective and emergent, while the Dark Tetrad traits are intrapsychic and often strategic or manipulative in expression (Jones & Paulhus, 2014). Particularly in the case of Machiavellianism and psychopathy, individuals may display goal-directed social behavior that appears cooperative on the surface but is ultimately self-serving (Amir & Malik, 2016; Deutchman & Sullivan, 2018), meaning their influence on leader effectiveness may bypass or distort the communal mechanism of knowledge-sharing. From a Social Exchange Theory perspective (Blau, 1964), knowledge-sharing relies on reciprocal trust and norm-based give-and-take. However, individuals high in Machiavellianism or psychopathy may violate these norms, thus weakening the credibility of knowledge-sharing as a consistent mediating pathway.

In the case of sadism, although its relationship with knowledge-sharing followed a significant U-shaped curve, this dynamic may be explained by atypical or paradoxical interpersonal strategies, such as using knowledge to exert control or inflict discomfort, which complicates its translation into collective performance appraisals. This reflects the instrumental use of social behaviors often observed in dark personality profiles, where overt actions (like sharing information) may not reflect genuine team-oriented intentions (Buckels et al., 2013).

This research contributes to the understanding of the Dark Tetrad traits by challenging linear assumptions frequently held in Industrial-Organizational psychology. By modeling curvilinear relationships, particularly inverted U-shapes, the findings suggest that traits traditionally labeled as maladaptive (e.g., narcissism, sadism) may exhibit context-dependent functional utility when expressed at moderate levels. This aligns with emerging perspectives in personality psychology (e.g., Judge et al., 2009; Spain et al., 2014), which propose that certain dark traits can have adaptive benefits under specific situational or dosage conditions. Additionally, the results underscore that not all dark traits operate uniformly in organizational settings, thus supporting the idea of trait specificity rather than trait generality in predicting workplace behaviors. Furthermore, the unsupported mediation role of knowledge-sharing in the relationship between Dark Tetrad traits and leader effectiveness indicates that interpersonal and communicative processes may not be the primary psychological mechanism explaining how these traits influence leadership perceptions. This challenges the existing mediation models rooted in social exchange and behavioral visibility theories and invites a shift toward exploring alternative mediators, such as emotional manipulation, impression management, or perceived authenticity.

Our findings caution organizations against oversimplified personality assessments in leader selection and development processes. While moderate narcissism might support confident and inspiring leaders, unchecked expressions can erode collaboration and long-term team functionality. As such, leadership development programs should aim to regulate - rather than eliminate - certain dark traits, focusing on self-awareness, adaptive use of assertiveness, and ethical boundaries. Moreover, the identification of an optimal level of knowledge-sharing indicates that more is not always better. Leaders should be trained not only to encourage open exchange but also to manage cognitive load, prioritize critical information, and avoid over-diffusion of responsibility within teams. The strong, consistent effect of age on knowledge-sharing also points to the value of age-diverse teams and mentoring structures, where more experienced members can facilitate knowledge-transfer and cultural continuity.

This study highlights the importance of testing both linear and nonlinear relationships in I-O psychology research. Many leadership and personality models assume linearity,

potentially overlooking meaningful patterns that emerge only when quadratic terms are modeled. The use of curvilinear regression and mediation techniques allowed for more precise estimation of complex dynamics and serves as a call for more nuanced statistical approaches in leadership and personality research.

Despite offering valuable insights, the present study has several limitations.

Our cross-sectional research design limits the ability to infer causal relationships. While the data analysis methods allowed exploration of curvilinear and indirect relationships, the temporal ordering of variables cannot be established. As such, it remains unclear whether dark personality traits influence knowledge-sharing behaviors and leader effectiveness, or whether team dynamics and leadership perceptions might also shape how such traits are perceived. Future studies should adopt research designs which are better at capturing causal relationships and their dynamics over time.

This study assessed leaders' Dark Tetrad traits using subordinates' perceptions rather than self-assessment. This approach is advantageous as it mitigates the biases commonly associated with self-reports from leaders, such as social desirability and lack of self-awareness (Rico-Bordera et al., 2025). Leaders high in dark traits may underreport or distort their responses due to impression management concerns. However, subordinates may not have accurate insight into the leader's internal motives, cognitive style, or emotional functioning - especially for traits like Machiavellianism or psychopathy, which can be intentionally concealed. As such, this perceptual mismatch between observable behavior and internal traits may compromise the validity of the trait assessment, making it difficult to determine whether the observed effects are due to actual leader characteristics or subordinate interpretations of behavior. Moreover, all variables were assessed using self-reports, which raises concerns about common method bias and social desirability effects. Participants may have responded in ways they perceived as socially acceptable, particularly regarding sensitive traits such as psychopathy or sadism. Future research should incorporate multi-source assessments, such as peer evaluations, supervisor ratings, and objective behavioral measures (e.g., frequency of shared documents, meeting participation). Mixed-methods approaches - such as combining quantitative ratings with qualitative interviews - may enhance the depth and credibility of perceived leader trait assessments. Additionally, future research could explore which specific behavioral cues subordinates use to infer traits such as those included in Dark Tetrad, potentially informing more targeted instruments.

The sampling strategy employed - snowball sampling across various organizations and industries - resulted in a heterogeneous sample. Although this enhances ecological validity of the study, it also introduces sampling bias and limits generalizability. Expanding the sample to include larger and more demographically balanced groups, including more male participants, underrepresented populations and varying hierarchical levels, would allow for greater generalizability and potential subgroup analyses.

CONCLUSIONS

This study examined how leaders' dark personality traits (narcissism, Machiavellianism, psychopathy, and sadism) relate to leadership effectiveness, and whether knowledge-sharing behaviors mediate these relationships.

Results showed that only narcissism followed a curvilinear (inverted U-shaped) pattern with leadership effectiveness, suggesting that moderate levels of narcissism may enhance, but low and excessive levels impair effectiveness. The other traits were linearly and negatively associated with leadership effectiveness. Regarding knowledge-sharing, sadism exhibited a U-shaped relationship, while narcissism showed a marginal trend; Machiavellianism and psychopathy showed no significant effects. Knowledge-sharing was positively associated with leader effectiveness in a curvilinear manner, with moderate levels predicting the highest outcomes. However, no significant mediation effects were found.

These findings offer a nuanced picture on Dark Tetrad, indicating that only certain dark

traits - particularly moderate narcissism - may enhance leadership effectiveness when expressed through socially adaptive behaviors.

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RESEARCH ARTICLE

How Perceived Stress Shapes Job Satisfaction, Affective Commitment, and Turnover Intention: Generational and Age Patterns

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Abstract

This study examines how perceived stress relates to emotional exhaustion, job attitudes, and turnover intention across age and generational groups in a Romanian industrial engineering and automation company. Grounded primarily in the Job Demands-Resources and Conservation of Resources frameworks, and complemented by generational and lifespan perspectives, we tested a model linking perceived stress, emotional exhaustion, job satisfaction, affective organizational commitment, and turnover intention. Survey data from N = 95 employees (Generations X, Y, and Z) were analyzed using ANOVA/ANCOVA, hierarchical regressions, and PROCESS mediation and moderated mediation models with 5,000 bootstraps, modeling generation as a categorical predictor and age as a continuous covariate. Higher perceived stress was strongly associated with greater emotional exhaustion and with lower job satisfaction and affective commitment. Emotional exhaustion fully mediated the relationship between perceived stress and turnover intention, while affective commitment partially mediated the job satisfaction-turnover intention link. Generational differences were observable at the cohort-mean level, but many effects were more parsimoniously explained by linear age once age was included in the models. The findings underscore the central role of perceived stress and emotional exhaustion in shaping turnover intentions and suggest that age-related developmental dynamics may be more informative than generational labels for understanding stress-attitude links in organizational settings.

Keywords

Perceived stress, Emotional exhaustion, Job satisfaction, Affective commitment, Turnover intentions, Generational differences

INTRODUCTION

Perceived stress and its consequences for employee well-being, motivation, and retention remain central concerns in organizational psychology, with extensive evidence showing that imbalances between demands and resources undermine energy, satisfaction, and affective commitment (Bakker & Demerouti, 2007; Hobfoll, 1989; Schaufeli & Bakker, 2004). Within this literature, the Job Demands-Resources (JD-R) model and Conservation of Resources (COR) theory offer robust explanations for why perceived stress, defined as subjective appraisals of unpredictability and lack of

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control (Cohen et al., 1983; Lazarus & Folkman, 1984), predicts emotional exhaustion, lower job attitudes, and stronger turnover intention. Yet organizations increasingly frame these stress experiences as generational, claiming that Millennials or Generation Z are "more stressed," "less committed," or "more likely to quit." Such beliefs have gained managerial traction, especially in rapidly changing industries.

However, the generational literature is marked by two unresolved problems. First, empirical findings on cohort differences are inconsistent and often small; meta-analyses show that many alleged generational gaps disappear once age, a continuous developmental variable, is included (Costanza et al., 2012; Lyons & Kuron, 2014). Second, research frequently conflates age and generation, treating them interchangeably despite being conceptually distinct: age reflects developmental change, whereas generation reflects shared socio-historical context (Rudolph et al., 2018). This conceptual ambiguity has produced contradictory claims about whether younger cohorts truly experience stress and strain differently or whether these patterns simply reflect age-related trajectories, such as fewer coping resources or earlier career instability.

This tension represents the core puzzle motivating the present study: Do perceived stress, emotional exhaustion, satisfaction, affective commitment, and turnover intention differ across generational groups because of true cohort effects or because of linear age trends?

However, since generational membership is defined by age, a cross-sectional design cannot fully disentangle age effects from cohort effects, even when statistically modeled separately. Following Costanza et al. (2012), researchers may include both variables in the same model to compare explanatory power and examine whether apparent cohort differences persist beyond linear age variance, while acknowledging that clean separation is impossible without longitudinal or repeated-cohort designs. Thus, any generational differences we report must be interpreted as descriptive cohort patterns, not as isolated cohort effects, since they remain inseparable from age-related variance in a cross-sectional design.

Despite intense practitioner interest, few studies examine age and generation simultaneously, and almost none do so within a single organizational context where job demands and resources are held relatively constant. The gap is even more pronounced in Eastern Europe, where empirical work linking perceived stress experiences with multi-age workforce dynamics remains limited (see also Marcus et al., 2024).

To address this gap, the present study tests a stress–strain–attitude–turnover sequence in a Romanian industrial engineering company, grounding the model primarily in JD-R and COR, with generational perspectives used only as a secondary explanatory overlay. By modeling generation as a categorical predictor (Gen X, Gen Y, Gen Z) and age as a continuous covariate, we evaluate whether apparent generational differences persist once age-related variance is accounted for, responding directly to long-standing calls for methodological clarity in generational research (Costanza et al., 2012; Rudolph et al., 2018). This approach enables us to determine whether younger cohorts truly show stronger stress reactivity, or whether age provides a more parsimonious explanation for exhaustion, job attitudes, and turnover intentions.

In doing so, the study contributes theoretically by clarifying the conditions under which perceived stress processes vary across demographic groups and by integrating stress theories with a more cautious and conceptually precise use of generational perspectives. Practically, the findings inform whether organizations should design retention and well-being interventions around generational categories or whether age-related patterns offer a more valid foundation for workforce management in contemporary Romanian and Eastern European contexts.

THEORY AND HYPOTHESES

Perceived Stress and Its Work-Related Implications

The Job Demands–Resources (JD-R) model conceptualizes stress as the result of an imbalance between job demands, such as workload, role conflict, or work–life interference, and the resources available to cope with them, including autonomy, support, and feedback (Bakker & Demerouti, 2007). Complementing this view, the Conservation of Resources (COR) theory proposes that stress arises when individuals experience or anticipate a loss of personal resources such as time, energy, or financial security (Hobfoll, 1989). Together, these frameworks emphasize that stress is fundamentally a perceived imbalance and thus strongly shaped by appraisals (Lazarus & Folkman, 1984).

High perceived stress is associated with numerous negative outcomes, including emotional exhaustion, reduced well-being, lower motivation, absenteeism, and turnover intentions (Bhui et al., 2016; Demerouti et al., 2001). Because our study uses the Perceived Stress Scale (PSS-10), we conceptualize stress as general perceived stress or a subjective appraisal of unpredictability and lack of control, which nevertheless influences work-related attitudes and outcomes.

Recent literature suggests that perceptions of stress may vary across generational locations because individuals raised in different historical contexts evaluate job demands and resources differently. Cultural shifts, such as economic uncertainty, digitalization, and rising individualism, have been shown to shape work expectations and stress sensitivity among younger cohorts (Campbell et al., 2017; Twenge et al., 2010). Three mechanisms help explain these differences. First, cultural-historical influences: formative events and technological environments shape generational expectations about work, stability, and work-life boundaries. Second, identity and stereotypes: generational narratives and stereotypes (e.g., "Millennials value balance," "Gen Z is always connected") may reinforce stress perceptions through internalized expectations (Riggio & Saggi, 2015). Finally, resource distribution: younger employees often have access to fewer structural resources (autonomy, seniority), while older workers benefit from accumulated experience and organizational status (Rudolph et al., 2018).

At the same time, critics emphasize that generational effects are often small and may reflect age or career stage rather than true cohort differences (Costanza et al., 2012). Testing both age and generational categories, therefore, remains important to clarify whether apparent cohort differences persist after accounting for life-stage effects.

Based on prior evidence that younger employees consistently report higher stress levels, due to economic precarity, blurred boundaries, and fewer coping resources, we predict:

H1: *Younger generational groups (Gen Z, Gen Y) will report higher levels of perceived stress than older groups (Gen X), reflecting both developmental and socio-cultural differences in demands, resources, and expectations.*

From Perceived Stress to Emotional Exhaustion and Turnover Intention

According to the JD-R model and COR theory, high demands and threatened or lost resources lead to strain responses such as emotional exhaustion, the core component of burnout, and the earliest indicator of resource depletion (Demerouti et al., 2001; Maslach et al., 2001). Because perceived stress reflects appraisals of overload and uncontrollability, higher levels of perceived stress, regardless of source, signal a mismatch between demands and coping resources and therefore predict exhaustion (Hobfoll, 1989; Lazarus & Folkman, 1984).

Emotional exhaustion is consistently linked to sustained demands such as workload, role conflict, and time pressure, and is associated with reduced motivation, poorer performance, and increased turnover intention (Maslach & Leiter, 2008; Schaufeli et al.,

2009). Exhaustion also initiates resource "loss spirals," further limiting recovery and increasing vulnerability to future strain (Hobfoll, 2001).

Age-related differences help refine this universal stress-strain pathway. Lifespan theory suggests that younger adults have less developed coping and emotion-regulation capacities and place greater emphasis on achievement and career progress, making them more reactive to stressors such as instability, conflict, or overload (Baltes, 1987; Walter & Scheibe, 2013). Older employees, in contrast, draw on accumulated experience and superior emotion regulation, which protects against exhaustion even under similar levels of perceived stress (Scheibe et al., 2015). Thus, any moderation is more likely attributable to age as a continuous developmental trajectory rather than to discrete generational categories.

Generational perspectives nevertheless provide a sociocultural overlay, suggesting that shared historical and technological contexts may influence how stressors are appraised. Younger cohorts (Millennials, Gen Z) have been found to report higher stress and exhaustion due to economic precarity, digital connectivity, and blurred work-life boundaries (American Psychological Association, 2018; Twenge et al., 2010). Therefore, both age and cohort may shape how perceived stress translates into exhaustion, although these effects often overlap (Costanza et al., 2012).

Based on JD–R and COR theory and prior empirical evidence, we predict:

H2: *Perceived stress is positively associated with emotional exhaustion, and this association is stronger for younger generational groups (Gen Z and Millennials) compared to older groups (Gen X).*

Emotional exhaustion also plays a central role in shaping turnover intention. It erodes job satisfaction, weakens affective commitment, and reduces engagement, thereby increasing employees' likelihood of leaving the organization (Taris et al., 2005; Wright & Cropanzano, 1998). Across numerous designs, exhaustion emerges as one of the strongest predictors of turnover intention, even beyond job attitudes or dispositional affect (N. P. Podsakoff et al., 2007; Schaufeli & Bakker, 2004).

Some studies suggest that this exhaustion-to-turnover relationship may be stronger for younger workers, who respond more negatively to unmet expectations or resource constraints (Hu et al., 2025; Lu & Gursoy, 2016). However, age and generational effects are difficult to disentangle, and existing evidence often stems from samples across different organizations, introducing confounds.

Our single-organization design offers a cleaner comparison. Based on prior work, we expect emotional exhaustion to mediate the stress-turnover link while acknowledging that its strength may differ by age or cohort.

H3: *Emotional exhaustion mediates the relationship between perceived stress and turnover intention, and this mediation is stronger among younger generational groups (Gen Z and Millennials) than among Gen X.*

Taken together, these findings position emotional exhaustion as the central strain outcome through which perceived stress affects key work attitudes. Building on this stress-strain pathway, the next section examines how exhaustion shapes job satisfaction and organizational commitment, two core attitudinal mechanisms in the broader process leading to turnover intention.

Job Satisfaction and Perceived Stress

Job satisfaction is a positive evaluative and emotional response to one's job, shaped by appraisals of work conditions and the alignment between job characteristics and personal values (Judge et al., 2001; Locke, 1969). As a core work attitude, job satisfaction predicts performance, retention, and overall well-being.

Within the JD–R model, job resources such as autonomy, support, and feedback serve as motivational drivers that increase job satisfaction, whereas high job demands and strain diminish satisfaction (Bakker & Demerouti, 2007; Spector & Jex, 1991). Perceived stress, defined as a subjective appraisal of overload, unpredictability, and

lack of control, reflects an imbalance between demands and coping resources and therefore contributes to reduced job satisfaction. COR theory reinforces this mechanism by proposing that sustained stress depletes personal resources such as energy and emotional resilience, making it more difficult for employees to maintain positive job evaluations (Hobfoll, 1989). Meta-analytic evidence confirms that higher levels of stress reliably predict lower job satisfaction (Bowling et al., 2010).

Generational perspectives provide a complementary sociocultural interpretation of this relationship. Recent cohorts such as Millennials and Gen Z have entered the workforce during periods of economic instability, rapid technological change, and increased digital connectivity, conditions that intensify perceived stress and heighten dissatisfaction when expectations for flexibility, meaningful work, or development opportunities are unmet (Grelle et al., 2023; Twenge et al., 2010). By contrast, older cohorts often value stability, organizational loyalty, and structured career paths, which may shape different satisfaction profiles under similar levels of stress.

However, generational explanations are not without critique. Some researchers argue that differences in satisfaction may reflect value-job fit or broader labor market conditions rather than cohort-specific attitudes (Lyons et al., 2015; Parry & Urwin, 2011). Others highlight structural disadvantages, such as precarious contracts and delayed career progression, that disproportionately affect younger cohorts and may partly explain their lower satisfaction levels (Costanza et al., 2012). These critiques suggest that both sociocultural context and structural constraints shape how different cohorts interpret and react to stress at work.

Taken together, JD–R and COR offer a clear mechanism through which perceived stress diminishes job satisfaction, while generational perspectives suggest that this negative association may be stronger among younger cohorts navigating more unstable and demanding work environments.

Based on JD-R and COR theory and prior evidence, we predict:

H4: *Perceived stress is negatively associated with job satisfaction, and this negative relationship is stronger among younger generational groups (Gen Z and Millennials) compared to older groups (Gen X).*

Affective Commitment and Perceived Stress

Affective commitment refers to an employee's emotional attachment to, identification with, and involvement in the organization (Meyer & Allen, 1991). Unlike job satisfaction, which reflects evaluations of one's job, affective commitment reflects a deeper relational bond that connects employees to their organization. This bond is strengthened when employees feel supported and valued and weakened when work conditions strain their personal resources.

JD-R theory proposes that job resources, such as supervisor support, feedback, and development opportunities, foster motivation and strengthen affective commitment through the motivational pathway (Bakker & Demerouti, 2007). Conversely, high demands and elevated stress levels undermine commitment by diminishing energy, reducing motivation, and weakening the employee-organization bond (Schaufeli & Bakker, 2004). From a COR perspective, stress depletes personal resources such as time, emotional energy, and resilience, making employees less able and less willing to invest further in the organization (Hobfoll, 1989). When individuals perceive sustained imbalance between demands and coping resources, the sense of reciprocity, central to affective commitment, is disrupted, and emotional attachment declines.

Generational perspectives provide additional insight into how different cohorts interpret and respond to stress in the context of organizational commitment. Younger cohorts such as Millennials and Gen Z have entered the workforce in more volatile economic and organizational environments, often prioritizing flexibility, fairness, and work-life balance (Grelle et al., 2023; Lyons & Kuron, 2014). When these expectations are unmet or when stress signals unsupportive or inflexible

conditions, younger generations may experience sharper declines in affective commitment. In contrast, older cohorts often place greater emphasis on stability, organizational loyalty, and long-term career investment, which may buffer the negative effect of stress on commitment.

Structural labor market conditions also shape generational patterns. Younger cohorts frequently face job insecurity, temporary contracts, or rapid organizational change, making them more sensitive to stress as a signal of unfairness or poor reciprocity. Meta-analyses show that job stressors such as workload, role conflict, and job insecurity consistently predict lower affective commitment (Cooper-Hakim & Viswesvaran, 2005; Mathieu & Zajac, 1990). These findings suggest that while perceived stress erodes affective commitment broadly, its impact may be amplified among younger generational groups, who often hold stronger expectations for support, development, and value alignment.

Although critics argue that generational differences may reflect career stage or age-related factors, cohort-specific experiences, such as entering the labor market during recessionary periods or through precarious employment, provide a sociocultural context that shapes how different groups interpret stress and organizational support (Costanza et al., 2012). Thus, examining both perceived stress and generational location offers insight into potential variability in the stress-commitment relationship.

Taken together, JD-R and COR frameworks suggest that perceived stress erodes affective commitment by taxing personal resources and weakening the psychological bond with the organization. Generational perspectives imply that this erosion may be stronger for younger cohorts navigating more unstable and demanding work environments.

H5: *Perceived stress is negatively associated with affective commitment, and this negative relationship is stronger among younger generational groups (Gen Z and Millennials) compared to older groups (Gen X).*

Job Satisfaction, Affective Commitment, and Turnover Intention

Job satisfaction and affective commitment represent two central work attitudes within the JD-R framework. Job satisfaction reflects employees' evaluations of their job experiences, while affective commitment captures their emotional attachment to the organization (Meyer & Allen, 1991). Although distinct, these attitudes are closely linked: satisfaction forms a more immediate appraisal of work conditions, whereas affective commitment reflects a deeper, value-based bond that develops over time.

A substantial body of research supports a sequential pathway in which job satisfaction predicts affective commitment, which in turn predicts turnover intention. Meta-analyses show that satisfied employees are more likely to develop strong affective bonds to their organization (Meyer et al., 2002), and that, more than satisfaction, commitment explains whether dissatisfaction ultimately translates into an intention to leave (Hom & Griffeth, 1995; Tett & Meyer, 1993). Within the JD-R and COR frameworks, this sequence reflects the interplay between resource evaluations and relational investment. When stress erodes satisfaction, employees experience resource loss, which weakens their emotional connection to the organization and increases the likelihood of turnover intentions.

Generational perspectives provide additional insight into how these attitudes relate. Younger cohorts (e.g., Millennials and Gen Z) tend to hold stronger expectations for development, fairness, and work-life balance. When stress diminishes satisfaction, these unmet expectations may lead younger groups to reduce commitment more quickly and to form stronger intentions to leave. In contrast, older cohorts may maintain commitment for longer due to accumulated investments, stability preferences, or stronger expectations of reciprocity. Although critics note that generational differences often overlap with career stage, empirical evidence shows that younger cohorts systematically report lower satisfaction and commitment and higher turnover intention, partly due to structural

labor market conditions (Costanza et al., 2012).

Taken together, prior evidence suggests a robust satisfaction-commitment-turnover intention sequence that aligns with JD-R and COR mechanisms. Perceived stress weakens satisfaction, reduced satisfaction undermines affective commitment, and lower commitment increases turnover intention. This sequential pathway is expected to operate across generational groups, though the magnitude of effects may differ depending on cohort-specific expectations and experiences.

H6: *Affective commitment mediates the relationship between job satisfaction and turnover intention, and this sequential pathway is expected to hold across generational groups.*

METHOD

Sample and procedure

This study used a cross-sectional survey design to examine perceived stress, emotional exhaustion, job satisfaction, affective organizational commitment, and turnover intention among employees of an industrial engineering and automation company located in Brașov, Romania. The organization is part of a larger Romanian-owned industrial group that delivers turnkey process-engineering and automation projects (design, installation, commissioning, and maintenance) for clients in food, pharmaceutical, chemical, and related industries in Europe and beyond. The company has a dual structure combining office-based technical–administrative staff and shop-floor personnel involved in production, assembly, and maintenance activities.

At the time of data collection (May–June 2025), the company employed 124 people. Of these, 114 employees were eligible to participate (excluding those on medical leave, with suspended contracts, or temporary collaborators). The questionnaire was distributed to the full eligible population, and 95 valid responses were obtained, yielding a response rate of 83.3%.

The sample was 77.4% male ($N = 72$) and 22.6% female ($N = 21$). Regarding occupational category, 63.4% (N = 59) worked in technical–administrative roles and 36.6% ($N = 34$) in production, assembly, or maintenance. Hierarchically, 18.3% ($N = 17$) held managerial positions and 81.7% ($N = 76$) were non-managers; hierarchical level was later included as a control in the analyses to account for potential confounding with stress and commitment. Educational levels were: 3.2% high school ($N = 3$), 26.9% vocational/post-secondary ($N = 25$), 48.4% university degree ($N = 45$), and 21.5% master's degree ($N = 20$). Organizational tenure was < 1 year for 10.8% of respondents ($N = 10$), 1–3 years for 20.4% ($N = 19$), 3–5 years for 29.0% ($N = 27$), and over 5 years for 39.8% ($N = 37$).

Both age and generational cohort were recorded. Age was treated as a continuous variable. Generational groups were defined using commonly used birth-year cut-offs: Generation X (1965–1980), Generation Y/Millennials (1981–1996), and Generation Z (1997–2012) (Geiger, 2015; Nwoko & Yazdani, 2023). A very small number of Baby Boomer employees (N = 2) were present in the organization but were excluded from generational analyses due to insufficient cell size; consequently, all generational comparisons focus on Generations X, Y, and Z.

Data were collected via an anonymous online questionnaire administered through the company's internal communication platform and email. Participation was voluntary, respondents were informed about the academic purpose of the study, and confidentiality was explicitly guaranteed. The non-experimental, cross-sectional design is consistent with best practices for examining work-related attitudes and perceived stress in organizational field settings.

Measures

Perceived stress was assessed with the 10-item Perceived Stress Scale (PSS-10) (Cohen et al., 1983), using the Romanian translation validated by Dumitrescu et al. (2014). The scale captures the extent to which recent

situations are appraised as unpredictable, uncontrollable, or overwhelming over the last 30 days. Items were rated on a 5-point Likert scale (1 = Never to 5 = Very often). Positively worded items were reverse-coded before computing total scores; higher values represent higher perceived stress. Internal consistency was excellent (α = .879).

Emotional exhaustion was measured using a 9-item adapted version of the emotional exhaustion subscale of **the** Maslach Burnout Inventory – Human Services Survey (MBI-HSS) (Maslach & Jackson, 1981), following the Romanian validation framework (Bria et al., 2014). Items capture feelings of emotional depletion at work. To ensure consistency across the questionnaire, we employed a 5-point response format (1 = Never to 5 = Very often), instead of the original 7-point format. Items were summed, with higher scores indicating greater exhaustion. The adapted scale demonstrated very good reliability (α = .884).

Turnover intention was assessed using the TIS-3 (Cammann et al., 1983), consisting of three items measuring employees' intention to leave the organization (e.g., "I'm thinking about quitting"). Items were rated on a 5-point Likert scale (1 = Strongly disagree to 5 = Strongly agree) to maintain consistency with the other measures. Higher summed scores reflect stronger turnover intention. Reliability was very good (α = .804). Prior research supports its use in Romanian organizational settings (Nemteanu & Dabija, 2020).

Affective organizational commitment was measured with the 9-item Organizational Commitment Questionnaire (OCQ) (Mowday et al., 1979), which captures emotional attachment, identification, and involvement with the organization. Following Romanian validation studies (Veress & Gavreliuc, 2018), items were presented on a 5-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). Higher summed scores indicate stronger affective commitment. Internal consistency was very good (α = .880).

Job satisfaction was measured with the 18-item short form of the Job Satisfaction Survey (JSS-18) (Spector, 1985), covering nine facets (pay, promotion, supervision, benefits, contingent rewards, operating procedures, coworkers, nature of work, communication). We used the Romanian translation lineage applied in Sabie, Popescu, and Crețu (2024). Items were rated on a 5-point Likert scale (1 = Strongly disagree to 5 = Strongly agree), with negatively keyed items reverse-coded. Summed scores represent overall job satisfaction. Internal consistency was good (α = .794).

Data analysis

All analyses were conducted in SPSS (Version 29.0; IBM Corp., 2022). Data preparation included case screening for missing values, assessment of multivariate outliers, and verification of statistical assumptions. Missing data were minimal (< 5%) and handled via listwise deletion. Outliers were examined using Mahalanobis distance ($p < .001$), but no cases were removed on this basis. Normality, linearity, and homoscedasticity were inspected through residual plots and skewness-kurtosis indices, and homogeneity of variances was checked with Levene's tests; diagnostics indicated that the data were adequate for the planned analyses.

Reliability for all composite scales was assessed using Cronbach's α, with values ranging from .79 to .88, indicating acceptable to very good internal consistency. Descriptive statistics and zero-order correlations among all main study variables (perceived stress, emotional exhaustion, job satisfaction, affective organizational commitment, turnover intention, and age) are reported in the Results section.

To examine age and generational influences, we first modeled generation as a categorical predictor (Gen Z, Gen Y, Gen X), consistent with our initial aim of testing whether employees from different cohorts differed meaningfully in their experiences of stress, strain, and work attitudes. However, in line with extensive critiques of generational research, which argue that many "generational differences" may actually reflect continuous age-related developmental processes rather than discrete cohort boundaries (Costanza et al., 2012; Lyons & Kuron, 2014), we also included age as a continuous variable in all analyses. This dual specification allowed us to test explicitly whether observed cohort differences persisted once age-related

variance was accounted for, and whether age offered a more parsimonious explanation than categorical generational membership. Because age and generation are conceptually intertwined in any single cross-sectional sample, our analytic strategy treated their effects cautiously. Variance inflation factors (all VIFs < 2.0) indicated no problematic multicollinearity between age, generation, or the control variables, supporting their simultaneous inclusion. This approach strengthens the study's methodological rigor, permitting a direct comparison between cohort-based and developmental explanations, thereby addressing a central critique raised by the generational literature.

After constructing composite scores for perceived stress, emotional exhaustion, job satisfaction, affective commitment, and turnover intention, hypothesis testing proceeded in stages aligned with H1–H6. First, bivariate correlations were used to establish baseline associations among variables. For H1, analysis of variance (ANOVA) and analysis of covariance (ANCOVA) were used to compare perceived stress across generational groups, supplemented by regression models treating age as a continuous predictor, in line with recommendations to avoid relying solely on arbitrary cohort cut-offs (Costanza et al., 2012).

For H2, H4, and H5, hierarchical linear regressions examined the predictive role of perceived stress on emotional exhaustion, job satisfaction, and affective commitment, respectively, while controlling for age, gender, tenure, and generation. For H3 and H6, we estimated mediation and moderated mediation models using the PROCESS macro - Model 4 and Model 59 (Hayes, 2013) with 5,000 bootstrapped samples. Mediation analyses tested indirect effects of perceived stress (via exhaustion) on turnover intention (H3), and of job satisfaction (via affective commitment) on turnover intention (H6). Moderated mediation models treated generation as a categorical moderator of the relevant paths, with age retained as a continuous covariate so that any cohort effects would reflect variance beyond age.

This analytic strategy provided a coherent test of both direct and indirect relationships, embedding the stress–strain–attitude–turnover logic derived from JD-R and COR, while incorporating age and generation as distinct, yet intertwined, sources of variance. All inferential tests used an alpha level of .05; effects at $p < .01$ and $p < .001$ are highlighted in the Results section to indicate stronger evidence (Figure 1).

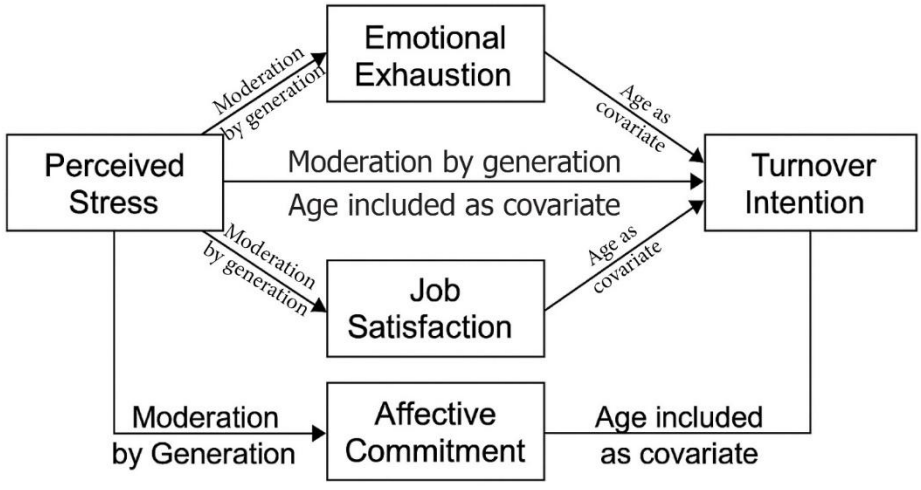

Figure 1. Conceptual model of hypothesized relationships

All hypothesis-specific statistics (ANOVA/ANCOVA, regression, and PROCESS output), along with detailed tables and visualizations, are presented in the Results section and corresponding Appendices.

RESULTS

Analyses were based on $N = 95$ valid cases (listwise deletion; <5% missing). All multi-item scales demonstrated good reliability ($\alpha = .79–.88$). Assumption checks supported model adequacy: residual distributions showed acceptable normality and homoscedasticity; linearity assumptions were met; and homogeneity of variances held where required. Multicollinearity was low (all VIFs < 2.0).

Given ongoing critiques of generational research, generational group was modeled as a categorical predictor (Gen Z, Gen Y, Gen X), while age was included as a continuous covariate to estimate whether cohort differences persisted once age-related variance was partialled out (Table 1). This approach acknowledges that age and generation cannot be fully disentangled in a cross-sectional design but allows us to assess whether any apparent cohort effects reflect age trends rather than genuine generational discontinuities.

H1: *Younger generational groups (Gen Z, Gen Y) will report higher levels of perceived stress than older groups (Gen X), reflecting both developmental and socio-cultural differences in demands, resources, and expectations.*

ANOVA revealed significant generational differences in perceived stress, $F(3, 91) = 4.73$, $p = .004$, $\eta^2 = .14$ (95% CI [.02, .23]), with homogeneity of variances satisfied (Levene's test: $F(3, 91) = 1.05$, $p = .374$). Descriptively, Gen Z reported the highest stress ($M = 28.32$), followed by Gen Y ($M = 24.39$), Gen X ($M = 22.47$), and Baby Boomers ($M = 22.00$, $n = 2$) (Figure 2). Boomers were retained only for descriptive completeness (Table 2).

Table 1. *Descriptive statistics by generation*

Generation	*N*	*M (PSS)*	*SD*	95% CI (Lower–Upper)
Gen Z	25	28.32	6.09	25.82 – 30.82
Gen Y	38	24.39	5.15	22.72 – 26.07
Gen X	30	22.47	5.11	20.56 – 24.37
Baby Boomers	2	22.00	1.41	—

Table 2. *ANOVA results for perceived stress across generations*

Source	*SS*	*df*	*MS*	*F*	*p*	η^2
Between groups	494.92	3	164.97	4.73	.004	.14
Within groups	3173.99	91	34.88			
Total	3668.91	94				

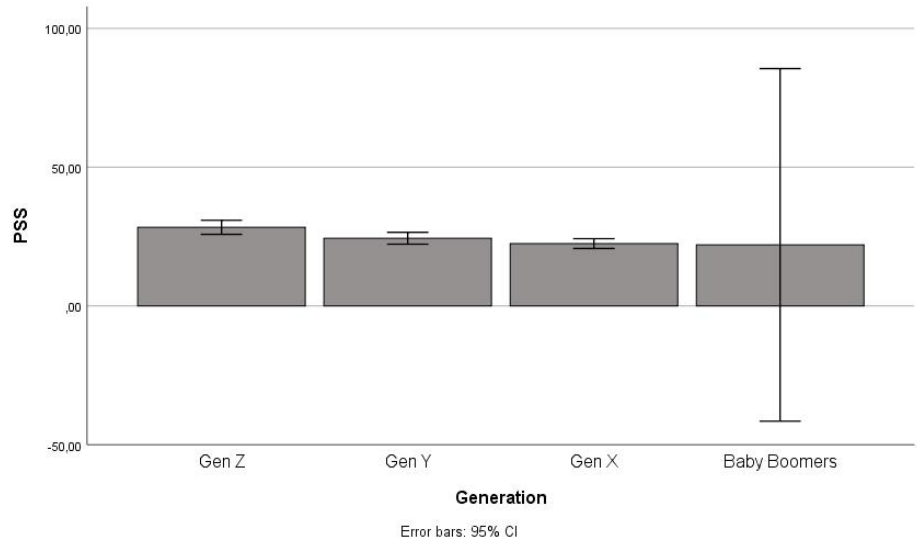

Figure 2. Bar chart of Perceived Stress by Generation

Tukey HSD post hoc tests indicated that Gen Z reported significantly higher stress than Gen X (p = .002) and marginally higher stress than Gen Y (p = .056).

To address critiques encouraging age-based analyses (Costanza et al., 2012), perceived stress was correlated negatively with age, $r(93) = –.33$, p = .001. Regression confirmed that age significantly predicted stress, $\beta = –.33$, 95% CI [–.50, –.14], explaining ~12% of stress variance, with no curvilinear effect (Age², p = .25) (Figure 3).

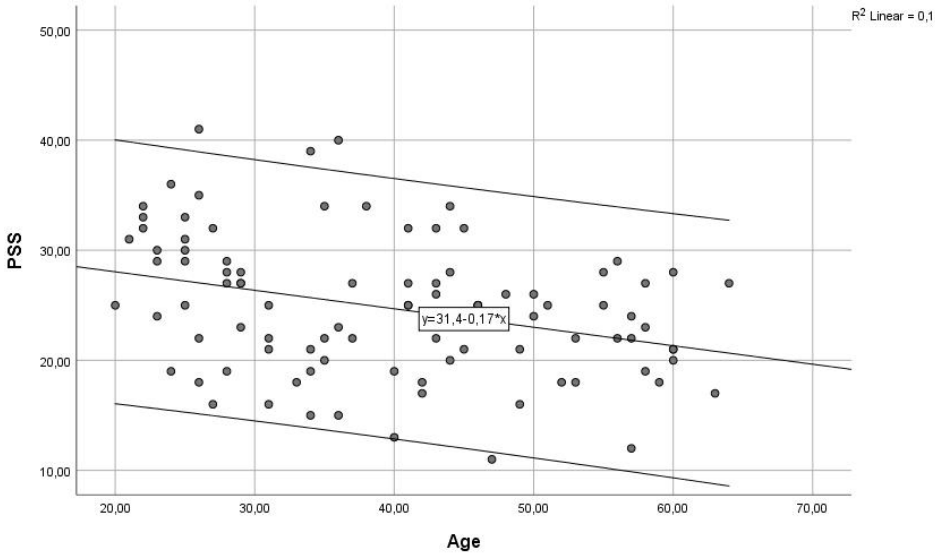

Figure 3. Scatterplot Stress vs. Age

An ANCOVA including age, gender, and tenure showed that the generational effect became non-significant once age was included, $F(3,88) = 0.86$, $p = .468$. Neither tenure nor gender predicted stress (ps > .25) (Table 3).

Interpretation: H1 was supported at the cohort-mean level, but effects did not persist after controlling for age. Results are more parsimoniously explained by a linear age effect: younger employees report higher perceived stress (Figure 4).

H2: *Perceived stress is positively associated with emotional exhaustion, and this association is stronger for younger generational groups (Gen Z and Millennials) compared to older groups (Gen X).*

Perceived stress significantly predicted emotional exhaustion, $B = 0.65$, $SE = 0.07$, $\beta = .70$, $t = 9.44$, $p < .001$, accounting for 49% of variance. Adding controls (age, gender, tenure) did not alter this relationship: stress remained significant ($B = 0.64$, $\beta = .68$, $p < .001$), and no control variable was significant.

Table 3. *Hierarchical regression predicting Emotional Exhaustion*

Predictor	***B***	***SE B***	***β***	***t***	***p***
Step 1 (Controls)					
Age	–.04	0.04	–.09	–.98	.332
Gender (0 = M, 1 = F)	–.11	1.06	–.01	–.11	.914
Tenure	.30	.53	.05	.57	.573
$R^2 = .06$, $F = 1.39$, $p = .241$					
Step 2 (Add Stress)					
Perceived Stress (PSS)	.64	.07	.68	8.52	<.001
$R^2 = .49$, $\Delta R^2 = .43$, $F = 17.89$, $p < .001$					

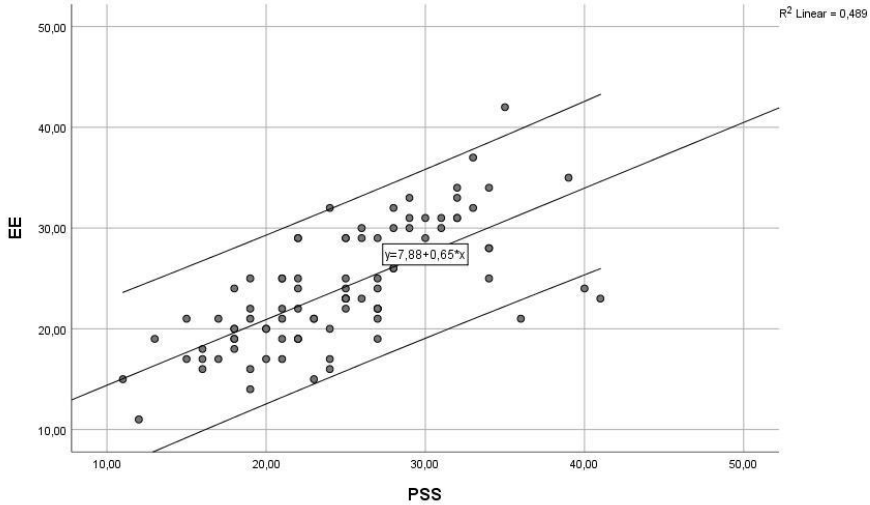

Figure 4. Scatterplot with regression line

To test moderation, a GLM including perceived stress and generational group showed a strong main effect of stress, $F(1, 90) = 20.88$, $p < .001$, $\eta^2 = .19$. The Stress × Generation interaction was also significant, $F(3, 90) = 22.97$, $p < .001$, $\eta^2 = .20$, suggesting differing slopes across groups (Table 4).

Table 4. *General Linear Model: Perceived Stress × Generation predicting Emotional Exhaustion*

Source	***df***	***F***	***p***	***η²***
Perceived Stress (PSS)	1, 90	20.88	<.001	.19
Generation	3, 90	1.56	.208	.05
PSS × Generation	3, 90	22.97	<.001	.20
Error	90	—	—	—

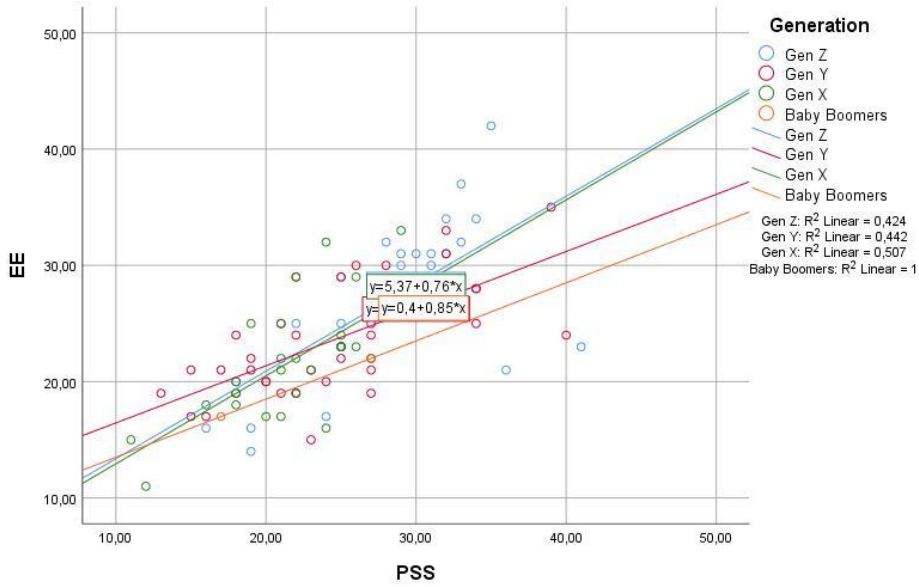

Figure 5. Interaction plot (Perceived Stress × Generation → EE)

However, as later PROCESS analyses (H3) demonstrate, this interaction does not replicate when age is treated as a continuous covariate, and bootstrapping is applied. Given the small generational subsamples, moderation should be interpreted with caution.

Interpretation: H2 is supported for the main effect of stress on exhaustion. Evidence for generational moderation is tentative and sensitive to analytic specification.

H3: *Emotional exhaustion mediates the relationship between perceived stress and turnover intention, and this mediation is stronger among younger generational groups (Gen Z and Millennials) than among Gen X.*

Using PROCESS Model 4 with 5,000 bootstraps, the mediation pathway was supported. Perceived stress predicted emotional exhaustion ($B = 0.63$, $p < .001$), which predicted turnover intention ($B = 0.24$, $p < .001$). The total effect of stress on turnover

intention was significant (B = 0.15, p = .003), but the direct effect became non-significant once exhaustion was added (*B* = 0.002, *p* = .98). The indirect effect (a × b) was significant, 95% CI [0.055, 0.253] (Table 5, Figure 5).

Table 5. *Mediation analysis (Model 4, PROCESS, N = 95)*

Path	***B***	***SE***	***t***	***p***	***95% CI (LL – UL)***
Stress → Emotional Exhaust.	.636	.075	8.52	<.001	[.49, .79]
EE → Turnover (controlling)	.241	.065	3.73	<.001	[.11, .37]
Stress → Turnover (total)	.155	.050	3.08	.003	[.06, .25]
Stress → Turnover (direct)	.001	.062	.02	.983	[–.12, .12]
Indirect effect (a × b)	.154	.050	—	—	[.055, .253]

Note. Indirect effect estimated with 5,000 bootstrapped samples.

Moderated mediation (Model 59) (Figure 7) showed no generational moderation on the stress-exhaustion path (p = .71), but significant moderation on the exhaustion-turnover intention path (p = .04). Conditional indirect effects were significant for Gen Z and Gen Y, but not Gen X (Table 6, Figure 6).

Table 6. *Moderated mediation analysis (Model 59, PROCESS, Generation as moderator)*

Generation	**Indirect Effect (a × b)**	***Boot SE***	***95% CI (LL – UL)***	***Sig.***
Gen Z	.24	.09	[.07, .41]	✓
Gen Y	.13	.05	[.04, .23]	✓
Gen X	.02	.07	[–.09, .17]	✗
Boomers	— (n too small)	—	—	—

Note. Indirect effects estimated with 5,000 bootstrapped samples. ✓ = CI does not include 0 (significant); ✗ = CI includes 0 (not significant).

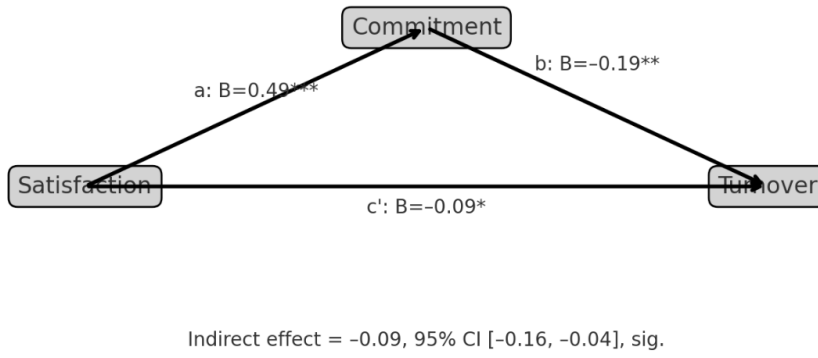

Figure 6. Mediation model (Satisfaction – Affective Commitment - Turnover)

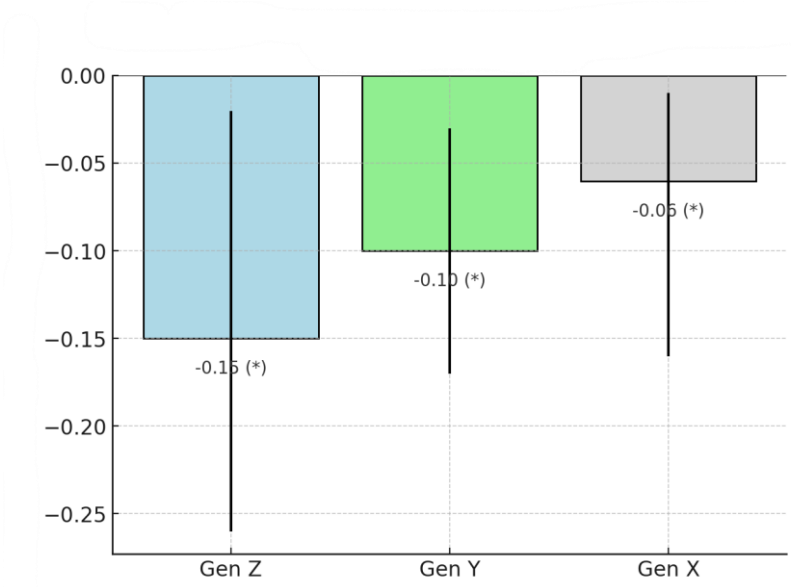

Figure 7. Conditional indirect effects by Generation (Model 59) – (Satisfaction – Affective Commitment – Turnover)

Note: Bars show the size of the mediation effect for Gen Z, Y, and X, with error bars = 95% bootstrap CI.

When age was included as a continuous covariate, the mediation held, and generational moderation remained attenuated on the first stage (stress-exhaustion) but present on the second stage (exhaustion-turnover) for younger cohorts.

Interpretation: H3 is supported as emotional exhaustion fully mediates the link between stress and turnover intention, and this indirect effect is stronger for Gen Z and Gen Y than for Gen X.

H4: *Perceived stress is negatively associated with job satisfaction, and this negative relationship is stronger among younger generational groups (Gen Z and Millennials) compared to older groups (Gen X).*

Perceived stress and job satisfaction were significantly negatively correlated, $r(93) = -.44$, $p < .001$. Regression showed that stress predicted lower satisfaction, B = –0.56, SE = 0.12, $\beta = -.44$, $t = -4.78$, $p < .001$, explaining ~20% of variance.

Adding controls improved the model ($R^2 = .24$): stress remained significant ($B = -0.63$, $p < .001$). No generational or age moderation effects were significant (all ps > .50) (Table 7, Figure 8).

Table 7. *Hierarchical regression predicting Job Satisfaction*

Predictor	***B***	***SE B***	***β***	***t***	***p***
Step 1 (Controls)					
Age	–.27	.16	–.42	–1.67	.098
Gender (0 = M, 1 = F)	–.55	1.76	–.03	–0.31	.757
Generation	2.24	2.45	.23	0.91	.364
R^2 = .06, F = 1.39, p = .241					
Step 2 (Add Stress)					
Stress (PSS-10)	–.63	.13	–.50	–5.05	<.001
R^2 = .24, ΔR^2 = .18, F = 17.89, p = .001					

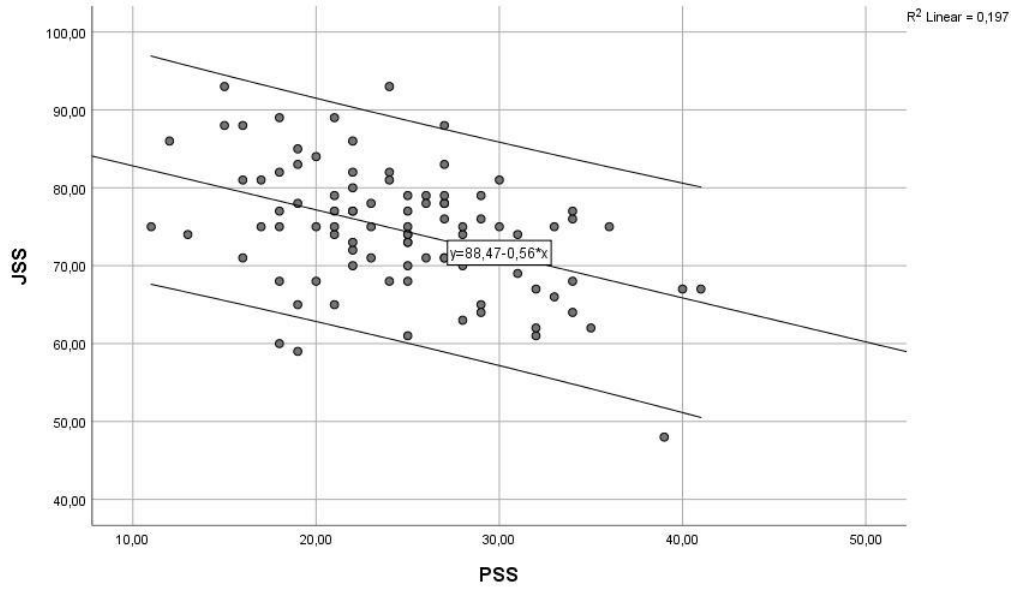

Figure 8. Scatterplot with regression line - perceived stress and job satisfaction

Interpretation: H4 is supported for the main effect but not for the hypothesized generational moderation.

H5: *Perceived stress is negatively associated with affective commitment, and this negative relationship is stronger among younger generational groups (Gen Z and Millennials) compared to older groups (Gen X).*

Stress and affective commitment were significantly negatively correlated, $r(93) = –.38$, $p < .001$. Regression showed that stress significantly predicted lower affective commitment, $B = –.37$, $SE = .09$, $\beta = –.38$, $t = –3.97$, $p < .001$.

Controlling for age, gender, and generation produced similar results: stress remained significant ($B = –.32$, $p = .002$). No Stress × Age or Stress × Generation interactions were significant (all ps > .20) (Table 8, Figure 9).

Table 8. *Hierarchical regression predicting Affective Commitment*

Predictor	***B***	***SE B***	***β***	***t***	***p***
Step 1 (Controls)					
Gender (0 = M, 1 = F)	–2.24	1.41	–.15	–1.59	.116
Age	.05	.13	.10	.40	.692
Generation	.09	1.97	.01	.05	.963
R^2 = .06, F = 1.39, p = .241					
Step 2 (Add Stress)					
Stress (PSS-10)	–.32	.10	–.33	–3.17	.002
R^2 = .18, ΔR^2 = .12, F = 4.82, p = .002					

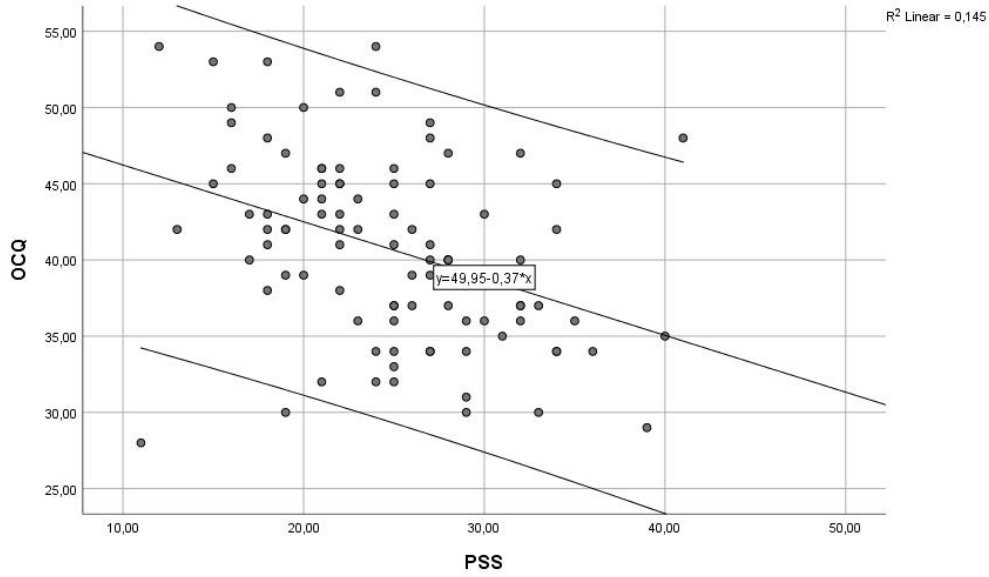

Figure 9. Scatterplot with regression line - perceived stress and affective commitment

Interpretation: H5 is supported for the main effect, since moderation by age or generation was not supported.

H6: *Affective commitment mediates the relationship between job satisfaction and turnover intention, and this sequential pathway is expected to hold across generational groups.*

PROCESS Model 4 (Figure 10) indicated significant partial mediation. Job satisfaction predicted affective commitment (B = 0.49, p < .001), and commitment predicted turnover intention (B = –0.19, p = .001). Both total (B = –0.18, p < .001) and direct effects (B = –0.09, p = .037) were significant. The indirect effect was significant, 95% CI [–0.16, –0.04] (Table 9).

Table 9. *Mediation analysis (Model 4, PROCESS, N = 95)*

Path	***B***	***SE***	***t***	***p***	***95% CI (LL – UL)***
Satisfaction → Affective Commitment	.49	.06	8.39	<.001	[.37, .61]
Affective Commitment → Turnover (cont.)	–.19	.06	–3.32	.001	[–.31, –.08]
Satisfaction → Turnover (c)	–.18	.03	–5.49	<.001	[–.24, –.12]
Satisfaction → Turnover (c′)	–.09	.04	–2.12	.037	[–.18, –.01]
Indirect effect (a × b)	–.09	.03	—	—	[–.16, –.04]

Note. Indirect effect estimated with 5,000 bootstrapped samples.

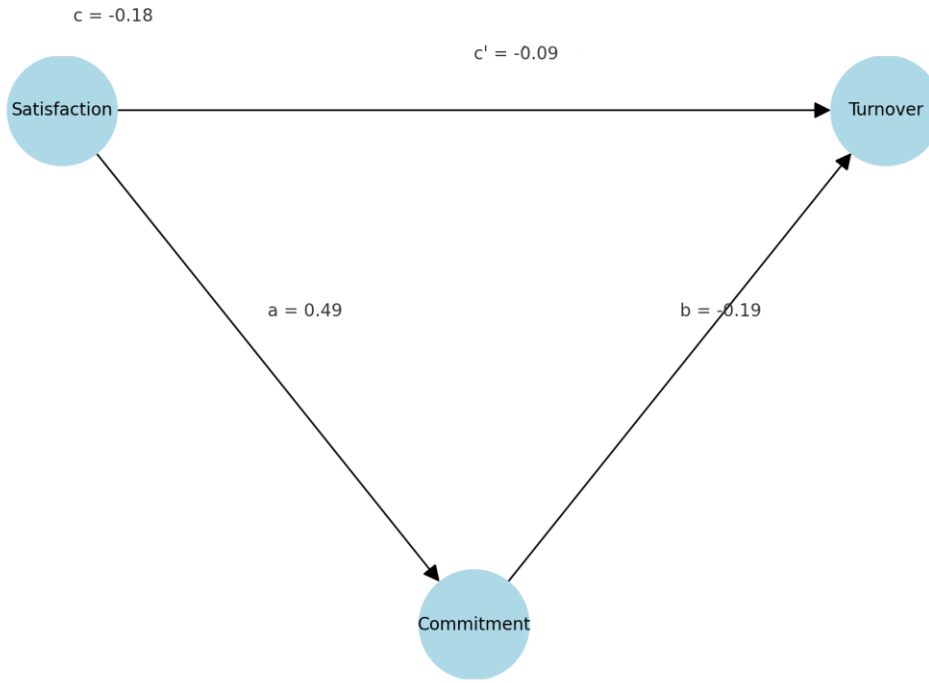

Figure 10. Mediation diagram (Model 4)

Moderated mediation (Model 59) (Figure 11) showed no generational moderation on either the a- or b-paths. The indirect effect was significant for all groups (Gen Z, Gen Y, Gen X) (Table 10).

Table 10. *Conditional indirect effects by Generation (Model 59, PROCESS, N = 95)*

Generation	Indirect Effect (a × b)	*Boot SE*	*95% CI (LL – UL)*	*Sig.*
Gen Z	–.15	.06	[–.26, –.02]	✓
Gen Y	–.10	.03	[–.17, –.03]	✓
Gen X	–.06	.04	[–.16, –.01]	✓
Boomers	— (n too small)	—	—	—

Note. Effects estimated with 5,000 bootstrapped samples. ✓ = confidence interval does not include 0 (significant).

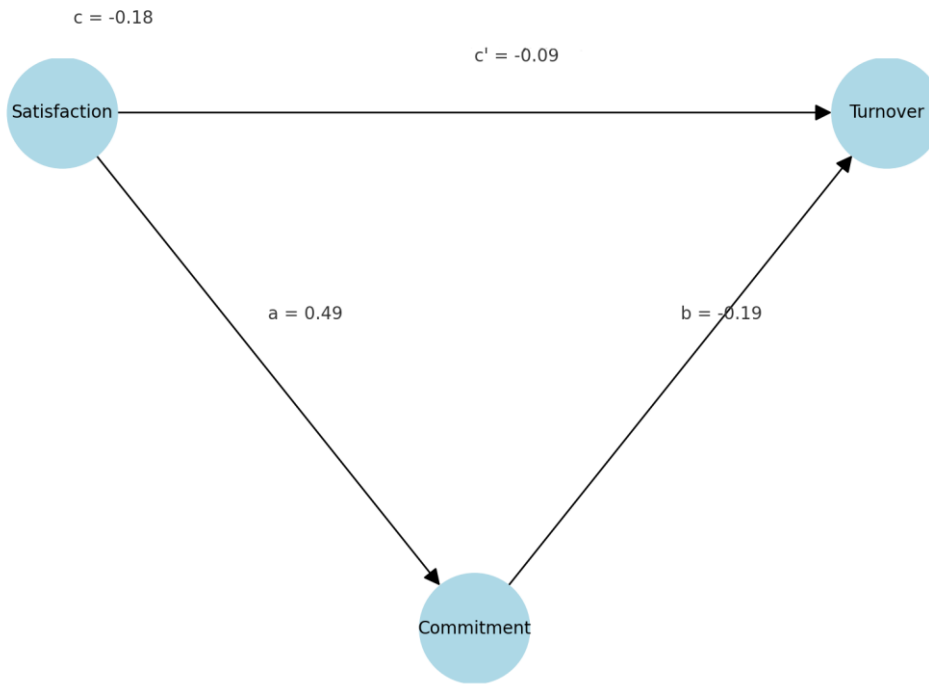

Figure 11. Conditional indirect effects (Model 59) – stress-affective commitment-turnover - by generation, with 95% bootstrap confidence intervals (error bars)

Interpretation: H6 is supported, since affective commitment partially mediates the satisfaction–turnover intention relationship, and this pattern holds consistently across generational groups.

DISCUSSION AND CONCLUSIONS

Summary of Main Findings

This study examined how perceived stress relates to emotional exhaustion, job satisfaction, affective organizational commitment, and turnover intention, and whether these processes vary across age and generational groups in a Romanian industrial engineering company. Grounded in the Job Demands–Resources (JD-R) model (Bakker & Demerouti, 2007) and Conservation of Resources (COR) theory (Hobfoll, 1989), and complemented generational and by lifespan perspectives, we tested a stress–strain–

attitude–turnover sequence using survey data from 95 employees.

Across analyses, higher perceived stress, conceptualized as a subjective appraisal of unpredictability and lack of control (Cohen et al., 1983; Lazarus & Folkman, 1984) was consistently associated with greater emotional exhaustion, lower job satisfaction, lower affective commitment, and higher turnover intention. Emotional exhaustion fully mediated the relationship between perceived stress and turnover intention, and affective commitment partially mediated the link between job satisfaction and turnover intention. These findings align with established evidence that emotional exhaustion is a central mechanism connecting stress to withdrawal intentions (Maslach et al., 2001; Schaufeli & Bakker, 2004).

At the generational level, ANOVA showed that Gen Z reported higher perceived stress than Gen X. However, once age was included as a continuous covariate, generational differences became non-significant, and a negative linear association between age and perceived stress emerged. This echoes critiques that generational effects often reflect age-related developmental processes rather than true cohort effects (Costanza et al., 2012; Lyons & Kuron, 2014; Rudolph et al., 2018).

Overall, the findings suggest that while descriptive generational patterns exist, age rather than generation offers a more parsimonious explanation for variability in stress, strain, job attitudes, and turnover intentions.

Theoretical Implications

This study contributes to theory in three main ways. First, by reinforcing JD-R and COR as the primary explanatory frameworks. The strong stress-exhaustion link confirms JD-R's health impairment pathway (Demerouti et al., 2001) and COR's predictions that perceived resource loss fuels strain and intensifies withdrawal tendencies (Hobfoll, 1989). Emotional exhaustion, a core burnout component (Maslach & Leiter, 2008), fully mediated the relationship between perceived stress and turnover intention, echoing prior findings that exhaustion is one of the strongest predictors of turnover intentions (Schaufeli & Bakker, 2004; Taris, 2006).

Second, it contributes to theory by clarifying the role of job attitudes in the stress-turnover process. Consistent with meta-analytic evidence (Meyer et al., 2002; Tett & Meyer, 1993), job satisfaction predicted affective commitment, which, in turn, predicted turnover intention. The partial mediation of the satisfaction-turnover link by affective commitment underscores the distinction between evaluative job attitudes and deeper emotional bonds to the organization (Meyer & Allen, 1991). Our results thus reinforce the JD-R/COR argument that strain erodes attitudes, which then shape withdrawal cognitions.

Third, our research contributes to theory by providing a refined, methodologically cautious contribution to the age vs. generation debate. By modeling generation as a categorical predictor while retaining age as a continuous covariate, we followed the approach recommended by Costanza et al. (2012). The finding that perceived stress differences did not persist once age was controlled aligns with critiques that generational research often confounds age, cohort, and career stage (Rudolph et al., 2018). The results support the view that generational categories may describe cohort-mean patterns, but these remain deeply intertwined with age-related developmental trajectories, particularly regarding coping resources, emotional regulation, and perceived control (Baltes, 1987; Scheibe et al., 2015).

Finally, by focusing on a Romanian engineering and automation context, rarely examined in stress or generational research, the study expands evidence from underrepresented Eastern European settings (Marcus et al., 2024).

Practical Implications

A first practical implication is the need to treat perceived stress and emotional exhaustion as key intervention targets. Given their strong associations with turnover intention, organizations should redesign workloads, clarify roles, strengthen supervisor support, and foster recovery opportunities, consistent

with JD-R and COR recommendations (Bakker & Demerouti, 2007; Hobfoll, 1989).

A second practical implication is to prioritize age-sensitive interventions over generational stereotypes. Because age explained perceived stress more consistently than generation, interventions should support early-career employees, who typically have fewer coping resources and higher volatility in career expectations (Lyons & Kuron, 2014). Mentoring, structured onboarding, and developmental feedback may help buffer stress and exhaustion.

Another implication is to strengthen job satisfaction and affective commitment as retention levers. Affective commitment emerged as a key predictor of turnover intention. Organizations should foster fairness, recognition, promotion opportunities, and supportive team climates, factors known to increase satisfaction and commitment (Meyer et al., 2002; Schaufeli & Bakker, 2004).

Last, but not least, HR practitioners should use generational categories cautiously in their practice. Generational narratives may oversimplify and reify stereotypes (e.g., "Gen Z is less resilient"), which can transform into self-fulfilling prophecies. Our results suggest focusing on structural and age-related factors, such as insecurity, skill development needs, and changing work-life boundaries.

Limitations and Future Research

A first limitation of our study is that it focused on a cross-sectional design. Although mediation analyses were theory-driven, causal relations cannot be inferred. Longitudinal and multi-wave designs are necessary to test temporal ordering (Ployhart & Vandenberg, 2010).

A second limitation is the single-company and single-country context. The study took place in one Romanian engineering firm with specific structural characteristics. Although this reduces contextual noise, it limits generalizability. Future research should examine diverse industries and cultural settings. Moreover, the research context implied a limited sample size and uneven cohort representation. The presence of only two Baby Boomers prevented meaningful generational comparisons. Small subgroup sizes also increase the risk of inflated moderation effects (Aguinis, 1995). Larger and cross-organizational samples are needed.

A third limitation refers to the inherent confounding of age and generation. As emphasized by Costanza et al. (2012), generational membership is defined by age and thus, age and generation cannot be disentangled in cross-sectional data. Our generational effects must therefore be interpreted as cohort-mean patterns that remain intertwined with age.

A fourth limitation refers to the exclusive reliance on self-report data. Although reliabilities were high, shared method variance may have influenced the associations (P. M. Podsakoff et al., 2003). Future studies should incorporate behavioral turnover data, supervisor ratings, and objective stressors.

A final limitation refers to the use of the PSS-10 (general perceived stress). Because the PSS-10 measures general rather than occupational stress (Cohen et al., 1983), interpretations must remain within the domain of perceived stress broadly construed. Future research could compare general and work-specific stress measures.

General Conclusions

This study demonstrates that perceived stress undermines emotional well-being, job satisfaction, affective commitment, and retention-related intentions, with emotional exhaustion playing a critical mediating role. Although cohort-mean differences appeared descriptively, linear age trends offered a more parsimonious explanation for variability in perceived stress and strain. The results caution against over-reliance on generational labels and instead support age-sensitive strategies that build coping resources, role clarity, and supportive leadership environments.

By integrating JD-R and COR with a precise and cautious use of generational theory, and by offering evidence from an under-researched Eastern European industrial context, the study advances understanding of how perceived stress shapes critical employee outcomes in contemporary organizations.

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RESEARCH ARTICLE

A New Version of the Evaluation of Motivational Persistence Questionnaire (EPM Questionnaire): Conceptual Grounding and Empirical Support

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Abstract

This study reports on a revised version of the Evaluation of Motivational Persistence questionnaire, expanding the original three-factor model by adding Ambition, Planning, and Self-discipline subscales. Psychometric properties were evaluated in two convenience samples totaling 3,875 participants. The subscales demonstrated generally good internal consistency and composite reliability, although Ambition and Self-discipline were slightly lower, indicating areas for improvement. Confirmatory factor analyses supported a five-factor factorial structure, suggesting that the Recurrence of unattained goals subscale should be eliminated. Measurement invariance across gender was also tested and received support. Convergent validity was assessed using average variance extracted and discriminant validity was examined via the Fornell–Larcker criterion, with most subscales meeting criteria, while a few subscale pairs displayed overlap that warrants further examination. Construct validity was further supported by correlations with established measures. While the instrument demonstrates promise for research and applied settings, additional work is required to strengthen its psychometric properties.

Keywords

motivation, motivational persistence, questionnaire, psychometric proprieties

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1. Introduction

1.1. Motivational Involvement versus Motivational Persistence

Motivation is typically defined in terms of the orientation, intensity, and persistence of behavior, capturing both the goals toward which effort is directed and the sustained engagement required to achieve them (Kleinginna Jr. & Kleinginna, 1981). Most early models of motivation (e.g., Alderfer, 1969; Maslow, 1943; McClelland, 1988; Vroom, 1964) concentrated primarily on the *orientation* component of motivation, seeking to explain what motivates individuals or what can be referred to as "motivational involvement". The other two components—*effort* (the force or energy an individual invests in pursuing their goals) and *persistence* (the perseverance and consistency in maintaining a motivated behavior or act)—have initially received significantly less attention in the literature (Constantin et al., 2008). Evidence supporting the distinction between motivational involvement and motivational persistence comes from previous work suggesting that motivation is best understood as a process involving two interdependent psychological systems: goal choice (i.e., selecting a specific objective) and goal striving (i.e., exerting effort to achieve the objective) (e.g., Gollwitzer & Oettingen, 2012). Goal choice resembles the orientation or direction of motivation, whereas goal striving is more closely associated with persistence in a motivational act - what happens after the decision to pursue a goal has been made.

This distinction underscores the need for an instrument aimed at assessing motivational persistence in the Romanian context. The initial development of such a measure was completed in 2011 (Motivational Persistence Scale; Constantin et al., 2011), resulting in a questionnaire comprising three dimensions: Pursuit of long-term goals/ purposes, Pursuit of current goals/purposes, and Recurrence of unattained goals/ purposes. The present article introduces an updated version of instrument (the Evaluation of Motivational Persistence [EPM] Questionnaire), which includes three additional dimensions, and evaluates the internal consistency and validity of the expanded scale. The subsequent sections provide a conceptual definition of motivational persistence and a detailed description of its dimensions as operationalized in both the original and the revised versions of the EPM questionnaire, before presenting the empirical approach used to evaluate the psychometric properties of the new version.

1.2. Motivational Persistence: Definition and Dimensions

Over time, studies have defined persistence in various ways: as the ability to continue efforts toward success despite fatigue or discouragement (Fernald, 1912); as a circumstantial behavioral response rather than a personality trait (Dorcus, 1935); as the tendency to complete any initiated task (Rethlingshafer, 1942); as reactance to obstacles that hinder goal achievement (Wright & Brehm, 1989); as a habitual tendency to overcome difficulties and seek solutions despite adversity (Neuman et al., 1990); as a temperamental dimension reflecting resistance to frustration and fatigue (Cloninger et al., 1991). Despite these variations, definitions of persistence generally converge on the notion of maintaining consistent effort over time, monitoring one's progress, and continuing toward goals despite obstacles, monotony, or waning interest (Constantin et al., 2011).

In this study, following Constantin et al. (2011), we define motivational persistence as an individual's predisposition to sustain long-term motivation in pursuing personally significant goals. Once a commitment is made, motivational persistence helps the individual to persevere against setbacks, restore motivation, and invest effort in achieving these goals. Therefore, motivational persistence represents the motivational process that bridges the gap between the initial deliberation and the consistent pursuit of long-term goals. The three factors identified in the original Motivational Persistence Scale (Constantin et al., 2011) correspond to stages in a temporal continuum that reflects how persistence unfolds over time and align with

the action phase of the Rubicon model (Gollwitzer, 1990). These factors - pursuit of long-term goals, pursuit of current goals, and recurrence of unattained goals - are described below.

The pursuit of long-term goals refers to the ability to renew and strengthen the motivational value of distant goals and to remain committed to resource-intensive, higher-order objectives despite the (sometimes considerable) costs they entail. Pursuit of long-term goals is closely related to other the concepts described in the literature, such as perseverance (Williams & DeSteno, 2008) and grit (Duckworth et al., 2007). Individuals with high levels on this dimension tend to set personal or professional goals that require careful planning and sustained effort over extended periods - often months or years. When faced with repeated obstacles, they increase rather than reduce their effort. Motivated and energized by their ideals, they consistently draw on available resources to advance toward their objectives

The pursuit of current goals is associated with the volitional aspect of everyday persistence and refers to the ability to maintain focus on ongoing tasks despite distractions, frustration, setbacks, boredom, fatigue, or stress (Constantin et al., 2011). Individuals with high scores on this dimension remain engaged in activities even when they become unpleasant or less interesting. Once they have established a concrete, short-term plan, they are unlikely to abandon it, driven by the motivation to complete what they have started.

The recurrence of unattained goals refers to past or currently inactive goals and represents a post-intentional, automatic process that helps maintain commitment to blocked or suspended pursuits. Recurrence of unattained goals supports the identification of new opportunities to attain valued goals that could not be completed (Constantin et al., 2011). Individuals with high levels on this dimension frequently revisit temporally abandoned personal goals and find it difficult to mentally detach from them. They may generate new ideas related to past projects or problems, or find ways to advance goals that were left incomplete.

1.3 Empirical Evidence on the First Version of the Questionnaire

The first version of the EPM questionnaire (Constantin et al., 2011), has been used in several studies at both the national level in Romania (Bostan et al., 2014; Chirila & Constantin, 2016; Dascălu et al., 2022; Hojbotă et al., 2013; Ionescu et al., 2022; Zegan & Antohe, 2022), and the international level (Akdağ, 2020; Cenberci & Beyhan, 2016; Demir & Yildirim, 2019; Ertem & Arı, 2022; Önalan & Magda, 2020; Öntürk & Yıldız, 2020). By 2022, the questionnaire had already been validated and published in three languages, including the original Romanian version, as well as Turkish (Akdağ, 2020) and Spanish (Quintana et al., 2022).

Studies using the questionnaire provide evidence for the positive outcomes of motivational persistence. Specifically, both the dimensions of pursuing long-term goals and pursuing current goals have been shown to exert a strong positive influence on job performance (Țuțu & Constantin, 2012) and to be associated with higher entrepreneurial intentions in Turkish women (Önalan & Magda, 2020). Beyond the context of work, studies have shown that volunteers exhibit higher motivational persistence compared to non-volunteers (Macovei & Constantin, 2011). Motivational persistence was also found to be significantly and positively related to self-efficacy, and moderately associated with perceived control and emotional involvement (Bostan et al., 2022). In the study of Bostan and her colleagues, motivational persistence directly and positively predicted perceived control over goal achievement, while also significantly mediating the relationship between goal type and perceived control over a 12-month period. In addition, motivational persistence is negatively correlated with procrastination tendencies (Ertem & Arı, 2022). Morever, it has been identified as a significant predictor of well-being (Ionescu et al., 2022).

Encouraged by these promising findings, we sought to revise the scale to capture additional dimensions of motivational persistence. Specifically, the new version of

the questionnaire now includes three new scales: Ambition, Planning, and Self-discipline. By incorporating these subdimensions, the scale provides a more nuanced and comprehensive assessment of motivational persistence, potentially improving its predictive validity across diverse contexts. A detailed description of the new subdimensions is provided in the following subsection.

1.4. The Newly Added Scales: Ambition, Planning, and Self-Discipline

Ambition reflects a relatively stable predisposition toward attaining success and accomplishing valued goals (Judge & Kammeyer-Mueller, 2012) and is often considered a component of broader constructs such as goal setting, self-enhancement values, conscientiousness, and achievement striving (Hirschi & Spurk, 2021b). It is typically measured as a combination of several elements, including high career aspirations, an ambitious disposition, a desire for advancement, strong self-confidence, competitiveness, and motivation to assume leadership roles (Hirschi & Spurk, 2021a). Empirical studies indicate that ambition is associated with performance at work (Bui et al., 2021; Hirschi & Spurk, 2021b; Huang et al., 2014), as well as income, educational attainment, and occupational prestige (Judge & Kammeyer-Mueller, 2012).

In this paper, we argue that ambition is a fundamental aspect of motivational persistence. Motivational persistence cannot be demonstrated by pursuing small or easily attainable goals, but by striving toward challenging objectives that require sustained effort and dedication. From this perspective, ambitious individuals are those who consistently seek self-improvement, envision meaningful future achievements, and commit to accomplishing significant long-term goals.

Planning, defined as the process of organizing and coordinating tasks, goals, and responsibilities, involves setting priorities and allocating time and resources efficiently. Conceptually, planning is described in the literature from several perspectives, including implementation intentions (Gollwitzer, 1999; Gollwitzer & Sheeran, 2006; Townsend & Liu, 2012), action planning (Prinz, 1997), goal setting (Locke & Latham, 2012). Empirical evidence suggests that planning has a range of positive behaviors spanning from adherence to diet and physical exercise programs (e.g., de Ridder et al., 2009; Scholz et al., 2007; Sniehotta et al., 2005) to increased work performance (Parke et al., 2018). Although some studies have begun to highlight certain limitations of planning (e.g., Townsend & Liu, 2012)—it remains a crucial process that allows individuals to articulate their positive behavioral intentions, thereby increasing the likelihood of goal attainment. Even simple planning strategies can have a meaningful impact on achieving goals. Research on implementation intentions demonstrates that they not only help individuals initiate their goals, but also support continued progress by reducing susceptibility to distractions. In addition, implementation intentions help individuals to disengage from unproductive courses of action and to avoid overexertion, thereby preserving cognitive and physical resources and facilitating more effective pursuit of subsequent goals (Gollwitzer & Sheeran, 2006).

In the EPM questionnaire, *planning* is evaluated by items that reflect an individual's tendency to maintain a clear course of action and an organized approach in their activities, as demonstrated through behaviors such as scheduling tasks in advance, recording daily or weekly activities, and utilizing agendas and checklists. Adding this factor to the EPM questionnaire calls for a precise differentiation between planning and the pursuit of current goals. While planning refers to the manner in which activities are organized and approached, the pursuit of current goals pertains to the implementation of these plans. The latter emphasizes executing what has been planned, achieving efficiency in daily tasks, maintaining focus, and ignoring potential distractions.

Self-discipline plays a central role in guiding behavior toward meaningful personal goals. It is closely related to a range of constructs, including self-control, self-regulation, willpower, grit, response inhibition, impulse control, effortful control,

and ego strength (Duckworth & Kern, 2011; Hagger et al., 2021). Costa Jr. et al. (1991) view self-discipline as a facet of conscientiousness, defining it as persistence in tasks that are not immediately engaging - that is, the ability to continue despite boredom or distractions. Duckworth and Seligman (2006) use self-discipline and self-control interchangeably, describing both as the capacity to suppress dominant impulses in service of higher-order goals. However, Hagger et al. (2021) provide empirical evidence that that self-discipline and self-control, while related, are distinct constructs. Similarly, Costa Jr et al. (1991) argue that self-discipline and self-control are not synonymous. They suggest that self-discipline is one aspect of the broader self-control construct, which additionally includes elements of neuroticism.

Beyond conceptual diversity and terminological inconsistencies, both self-discipline and self-control have been shown to predict positive outcomes, such as academic performance and workplace success (Duckworth & Seligman, 2006; Hagger & Hamilton, 2019). A high level of self-discipline/ self-control has been found to improve mood, leading to greater happiness and well-being (Hofmann et al., 2013). Furthermore, self-discipline is associated better social functioning, and more cohesive relationships (Duckworth & Kern, 2011; Hagger et al., 2021), as well as physical health and wealth (Moffitt et al., 2011).

In the EPM questionnaire, we view self-discipline as the tendency to remain steadfast in honoring personal commitments and to follow obligations and promises despite temptations or competing desires. In the context of this study, it is important to distinguish self-discipline from both pursuit of long-term goals and planning, which are other dimensions of the EPM questionnaire. Regarding its relationship to pursuit of long-term goals, we draw on Hagger and Hamilton (2019), who argue that self-discipline and grit represent related but distinct constructs. Self-discipline involves regulating behavior at the level of subordinate goals—for example, resisting the temptation to eat hyper caloric foods when on a diet. Grit, on the other hand, which is akin to the pursuit of long-term goals measured by the EPM questionnaire, involves sustained focus and effort toward higher-order, long-term goals, guiding actions and resources across multiple subordinate goal conflicts over time. Thus, an individual may exhibit high self-discipline in managing immediate impulses yet fail to consistently pursue long-term goals, illustrating that self-discipline can operate independently of long-term goal pursuit.

Despite apparent overlap, self-discipline and planning also represent distinct constructs. In self-discipline, the focus lies on the individual's ability to uphold commitments and maintain consistency despite temptations, distractions, or short-term costs. Planning, by contrast, emphasizes organization, attention to detail, and a structured approach to tasks. A highly organized person may fail to follow through on plans if self-discipline is lacking, whereas a self-disciplined individual can honor commitments even without a strong tendency toward detailed planning or rigid organization. In other words, self-discipline ensures that obligations are met and actions are sustained, while planning provides a roadmap for achieving goals efficiently; one can be self-disciplined without being highly organized, and conversely, one can plan meticulously without consistently executing those plans.

1.5 Overview of the Present Study

The present study aimed to evaluate the psychometric properties of the extended EPM questionnaire. Specifically, we assessed the internal consistency of the newly added scales and examined the factorial structure of the revised instrument. In addition, we assessed measurement invariance across gender, as well as the convergent and discriminant validity of the questionnaire. To achieve these objectives, we analyzed large datasets collected via the PsihoProfile platform (https://www.psihoprofile.ro/) by Romanian practicing psychologists.

2. Method

2.1 Participants

Two samples of Romanian participants were included in the present study. The first sample consisted of 3,500 participants, of whom 64.1% completed the questionnaire online, with the remaining participants completing a paper-and-pencil version. The sample was balanced in terms of gender distribution (46% men, 54% women). Participants ranged in age from 16 to 73 years (M = 32.83, SD = 11.88). Regarding educational attainment, 6.48% had lower secondary or primary education, 31.41% reported high-school or post–high-school education, 30.50% held a bachelor's degree, while 9.24% had completed postgraduate studies (master's or doctoral degrees). The rest of the sample (22.37%) did not report their educational level. This sample was used to conduct internal consistency analyses, confirmatory factor analyses (CFA), and gender-based measurement invariance testing.

Sample 2 consisted of 1,375 participants, distinct from those in the first sample, 58.2% of whom were women. Participants' ages ranged from 16 to 72 years (M = 28.66, SD = 12.02). Educational attainment varied: 0.1% had completed only primary school, 24.9% had completed lower secondary school, 18.6% had completed high school, 1.9% had post-secondary vocational training, and 8.2% had vocational or professional school training. Additionally, 18.6% held a bachelor's degree, 11.3% had completed postgraduate studies (the remaining 16.3% did not report their education level). This sample was used to test the revised version of the questionnaire resulting from adjustments based on the first CFA.

Additional subsamples from the first sample completed the EPM questionnaire together with other measures used for convergent and divergent validity. A total of 237 participants completed the EPM and the VIA Inventory of Strengths-Revised (VIA-IS-R; McGrath, 2019). Participants (43.9% men) were aged from 18 to 60 years (M = 35.95, SD = 11.63; median = 35). Another subsample, totaling 1,033 participants, completed the EPM together with the Primal Beliefs Inventory (Clifton et al., 2019). The majority of the participants were women (62.1% women), with ages ranging from 16 to 75 years (M = 32.02, SD = 11.02). Finally, 1,405 participants completed the EPM along with the Styles of Work questionnaire (Constantin et al., 2010). Participants, of whom 62.6% were women, were aged between 16 and 71 years (M = 28.96, SD = 12.33).

2.2 Instruments

The Evaluation of Motivational Persistence Scale. The initial version of the questionnaire (Constantin et al., 2011) consisted of 13 items assessing Pursuit of long-term goals, Pursuit of current goals (4 items each), and Recurrence of unattained goals (5 items).

When the questionnaire was added to the Psihoprofile platform, one additional item was included for both the Pursuit of long-term goals and Pursuit of current goals scales, for reasons of symmetry, as well as to avoid potential issues with internal consistency. Subsequent data collection and analyses indicated the need for several revisions to the items in the originally published version. Beyond these minor adjustments, more substantial changes were introduced, specifically the addition of three new scales assessing Ambition, Planning, and Self-discipline, each composed of five items. Thus, the version of the questionnaire administered in the present study initially contained 30 items. Participants are asked to read the list of statements and select the option that best reflects their usual way of thinking and acting, using a 5-point Likert scale ranging from 1 (*to a very small extent*) to 5 (*to a very large extent*). Several items were reverse scored. For the full list of items, see Table 1. Preliminary internal consistency and exploratory factor analyses were conducted on a smaller sample, providing initial support for the structure and reliability of the new version. However, the present article focuses on confirmatory factor analyses based on the larger datasets collected via the Psihoprofile platform, and the results of these preliminary analyses are not reported here.

VIA Inventory of Strengths-Revised (VIA-IS-R; McGrath, 2019). The VIA-IS-R

consists of 192 items assessing 24 character strengths and six virtues, with eight items per strength. The inventory includes scales measuring perseverance (e.g., "I never get sidetracked when I work") and self-control/self-regulation (e.g., "It is easy for me to stay disciplined"), which were expected to be strongly related to motivational persistence. Participants completed the entire instrument to assess not only the convergent validity of the EPM questionnaire but also its discriminant validity. Items are rated on a 5-point scale ranging from 1 (*very much unlike me*) to 5 (*very much like me*). Internal consistency in the present sample was acceptable, ranging from α = .66 for judgement to α = .90 for love.

Primal Beliefs Inventory (PI; Clifton et al., 2019). The original version of the PI comprises 99 items assessing 26 primals - defined as general beliefs about the world that influence how individuals think, feel, and act - including 22 tertiary primals (five of which are neutral, not subordinate to any secondary factor), three secondary primals (Safe, Enticing, and Alive), and the primary primal (Good). In this study, the Romanian version of the questionnaire included 140 items, incorporating additional items recommended by Clifton et al. (2023) when translating and adapting the instrument to other languages. Participants were instructed that the statements describe the world as it is, not as we wish it to be, and were asked to indicate their level of agreement on a scale, from 1 (*strongly disagree*) to 6 (*strongly agree*). Our focus was on tertiary primals and their relationship with motivational persistence as measured by the EPM. Therefore, total scores for secondary and primary factors were not computed. Internal consistencies in the present sample ranged from .55 (Changing) to .89 (In Progress).

The Styles of Work Questionnaire (Constantin et al., 2010). The questionnaire includes 70 items and assesses 10 dimensions that describe an individual's work style (i.e., how a person relates to work or the organizational context and approaches professional tasks). The dimensions are: Adaptive – innovative, Planned – spontaneous, Dependent – independent, Individualistic – collectivistic, Dedicated – detached, Relaxed – tense, Impulsive – controlled, Analytical – intuitive, Demotivated – motivated, and Energetic – exhausted. Items are statements with two forced-choice response options, along with an intermediate option ("?") for participants who are undecided or do not identify with either extreme (e.g., "I typically: a) adjust my activities spontaneously based on the problems that arise; b) ?; c) prefer to plan my time in advance and follow my schedule."). Internal consistencies ranged from .56 (Dedicated – detached) and .58 (Relaxed – tense), the scales with lower reliability, to .85 (Energetic exhausted). For the purpose of examining the validity of the EPM questionnaire, we were primarily interested in correlations with the Planned– spontaneous and Demotivated – motivated scales.

Table 1. *Items of the EPM Questionnaire*

	Original item and English translation	**Scale**	**Retained in the final version of the EPM questionnaire?**
1.	Îmi place să îmi stabilesc obiective simple, ușor de atins. *I like to set up simple and easy-to-reach objectives for myself.*	Ambition (–)	No
2.	Prefer realizările imediate în locul proiectelor sau scopurilor pe termen lung. *I prefer immediate achievements instead of long-term goals or projects.*	Pursuit of long-term goals (–)	No

3.	Îmi place să-mi notez din timp activitățile zilnice sau săptămânale. *I like to write down my daily/weekly to-do list in advance.*	Planning	Yes
4.	Rareori reușesc să finalizez tot ceea ce mi-am propus să fac într-o anumită zi. *I rarely fully go through with my planned daily activities.*	Pursuit of current goals (–)	Yes
5.	Mă mai gândesc încă la diferite moduri în care aș putea folosi oportunități la care am renunțat. *I still think about different ways I could use opportunities that I gave up.*	Recurrence	No
6.	Sunt o persoană disciplinată în tot ceea ce fac. *I am a disciplined individual in anything I do.*	Self-discipline	Yes
7.	Îmi place să mă gândesc la reușite sau realizări personale ambițioase. *I like to think about achievements or ambitious personal accomplishments.*	Ambition	Yes
8.	Obiectivele pe termen lung mă motivează să depășesc greutățile de zi cu zi. *Long-term goals motivate me to overcome day-to-day hardships.*	Pursuit of long-term goals	Yes
9.	În fiecare dimineaţă verific ce am planificat, înainte de a trece la treabă. *I check my planned activities every morning, before I get to work.*	Planning	Yes
10.	De regulă, nu respect cele stabilite pentru o anumită zi sau săptămână. *I usually do not stick to what is set for a certain day or week.*	Pursuit of current goals (–)	Yes
11.	Chiar dacă nu mai contează, continui să mă gândesc la obiective personale la care am fost nevoit să renunț. *I still think about the goals I gave up on, even though they don't matter anymore.*	Recurrence	No
12.	Îmi respect angajamentele luate, chiar și atunci când am de pierdut sau sunt în dezavantaj. *I honor my commitments, even when I lose or am at a disadvantage.*	Self-discipline	Yes
13.	Simt nevoia să îi depășesc pe ceilalți sau să realizez lucruri deosebite în viață *I feel the need to prove myself or to achieve great things.*	Ambition	No
14.	Continui să investesc timp și efort în idei și proiecte care cer ani de răbdare și de muncă. *I continue to invest time and effort in projects that require years of patience and hard work.*	Pursuit of long-term goals	Yes
15.	Folosesc agendă și liste pentru a planifica ce am de făcut de la o zi la alta. *I use an agenda and make lists to plan what I have to do every day.*	Planning	Yes

16.	Când îmi planific să fac ceva într-o zi, nu mă las până nu fac ceea ce mi-am propus. *When I plan to do something on a certain day, I don't stop until I do what I set out to do.*	Pursuit of current goals	Yes
17.	Mă surprind că revin cu gândul la inițiative mai vechi, abandonate. *I often find myself thinking about older, abandoned initiatives again.*	Recurrence	No
18.	Chiar dacă nu este necesar, îmi pun mereu lucrurile în ordine, la locul lor. *I still keep things well organized, even when it's not necessary.*	Self-discipline	Yes
19.	Sunt o persoană ambițioasă. *I am an ambitious person.*	Ambition	Yes
20.	Îmi menținmotivația chiar și în activitățile care se întind pe luni de zile. *I keep my motivation even in activities that stretch over months.*	Pursuit of long-term goals	Yes
21.	Planific în detaliu ceea ce am de făcut pentru a doua zi. *I plan in detail what I have to do for the next day.*	Planning	Yes
22.	La sfârșitul fiecărei zile, de regulă, constat că nu am făcut ceea ce mi-am planificat. *By the end of the day, I often find that I didn't accomplish what I had planned.*	Pursuit of current goals (–)	Yes
23.	Îmi este ușor să uit un proiect important pentru mine, dar la care am renunțat în favoarea altor priorități. *It's easy for me to forget an important project that I gave up on to focus on other priorities.*	Recurrence (–)	No
24.	Când îmi stabilesc o limită (de timp, la cumpărături/ mâncare), de multe ori o încalc. *I usually break self-imposed limits (for example, with shopping, food, time, etc.).*	Self-discipline (–)	No
25.	Vreau mereu mai mult de la mine și de la viitorul meu. *I always expect more from myself and from my future.*	Ambition	Yes
26.	Nu îmi place să urmăresc scopuri sau obiective care cer luni sau ani de efort. *I don't like to pursue goals that require months or years of effort.*	Pursuit of long-term goals (–)	No
27.	Reactualizez periodic lista cu obiective pe care le voi atinge la un moment dat. *I regularly update my list of personal goals that I will achieve in the future.*	Planning	Yes
28.	Sunt eficient în atingerea obiectivelor zilnice. *I am efficient in achieving my day-to-day objectives.*	Pursuit of current goals	Yes
29.	Mă întorc mereu cu gândul la proiecte sau dorințe personale încă nerealizate. *I always think back to personal projects or desires that I haven't yet accomplished.*	Recurrence	No

30. Prin disciplină și perseverență mi-am atins cele mai importante obiective în viață. *Through discipline and perseverance, I have achieved my most important goals in life.*	Self-discipline	Yes

2.3 Overview of the Analyses

We evaluated the psychometric properties of the EPM questionnaire through several steps. Internal consistency was assessed using Cronbach's alpha and composite reliability, and descriptive statistics were computed for all scales. Confirmatory factor analyses (CFA) were conducted on two independent samples using the diagonally weighted least squares (DWLS) estimator, appropriate for ordinal data, with the Satorra-Bentler correction applied for global model fit evaluation. Model fit was evaluated using the Comparative Fit Index

(CFI), the Tucker-Lewis Index (TLI), the Standardized Root Mean Square (SRMR), and the Root Mean Square Error of Approximation (RMSEA). CFI and TLI values ≥ 0.95, SRMR values < .08 and RMSEA < .06 were considered to be indicative of well-fitting models (Hu & Bentler, 1999). Convergent validity was examined through the computation of average variance extracted (AVE). Discriminant validity was assessed using the Fornell–Larcker criterion. According to this approach, discriminant validity is demonstrated when a construct explains more variance in its indicators than it shares with other constructs. Measurement invariance across gender was tested to ensure the questionnaire operates equivalently for male and female participants. Additionally, correlations between the EPM questionnaire and external measures (VI-IS-R, PI, and SWQ) were examined to provide further evidence of construct validity. All analyses were conducted in R using the *psych* (Revelle & Revelle, 2015), *lavaan (*Rosseel, 2012), and *semTools* (Jorgensen et al., 2016) packages.

3. Results

3.1 Internal Consistency

The reliability analyses for the EPM questionnaire scales are presented in Tables 2 and 3. All scales, except for Ambition, exhibited acceptable internal consistency, with Cronbach's α above the .70 threshold. The initial Ambition scale (5 items) was problematic due to item I1, which was removed. The revised 4-item Ambition scale (I7, I13, I19, I25) showed improved internal consistency but remained below the threshold (α = .62). Consequently, item I1 was also excluded from the CFA. Composite reliabilities for the final EPM scales, after removing items with weak loadings in the CFA (see section 3.2), are presented in Table 3.The composite reliability values for the final EPM questionnaire scales are slightly below ideal but still acceptable. Planning demonstrates the strongest reliability, while Ambition, Implementation, and Self-discipline show lower internal consistency, indicating that these scales might be improved in future revisions.

Table 2. *Descriptive Statistics and Cronbach's Alphas for the EPM Questionnaire Scales*

Scale	*M*	*SD*	*Min*	*Max*	*Skew*	*Kurtosis*	*Cronbach's α*
Ambition (initial scale, 5 items)	3.69	.60	1	5	-.36	.46	.50
Ambition (final scale, 3 items)	4.10	.73	1	5	-.92	1.22	.68
Pursuit of long-term goals (initial scale, 5 items)	3.58	.76	1	5	-.43	.12	.73
Pursuit of long term goals (final scale, 3 items)	3.68	.89	1	5	-.57	.00	.76
Planning	3.07	.99	1	5	-.13	-.75	.85
Pursuit of current goals	3.74	.78	1	5	-.63	.33	.77
Self-discipline (initial scale, 5 items)	3.78	.71	1	5	-.52	.16	.68
Self-discipline (final scale, 4 items)	3.84	.76	1	5	-.62	.40	.71
Reccurence of unattained goals (eliminated)	2.61	.85	1	5	.22	-.30	.82
Motivational persistence (final, 20 items)	3.64	.64	1	5	-.43	.19	.89*

Note. *Omega Total = .91, Omega hierarchical = .75. Figure 1 displays the items that make up the final scales. No items were removed from the initial version of Planning and Pursuit of Current Goals.

Table 3. *Composite Reliabilities for the EPM Questionnaire (Final Scales)*

Scale	Composite Reliability
Ambition	.65
Pursuit of long-term goals	.68
Planning	.82
Implementation	.68
Self-discipline	.64

3.2 Results of the Confirmatory Factor Analyses

A hierarchical CFA was conducted to examine the structure of the EPM questionnaire. The model included six first-order latent factors, i.e., Ambition (I7, I13, I19, I25), Pursuit of long-term goals (I2, I8, I14, I20, I26), Planning (I3, I9, I15, I21, I27), Pursuit of current goals (I4, I10, I16, I22, I28), Self-discipline (I6, I12, I18, I24, I30), and Recurrence of unattained goals (I5, I11, I17, I23, I29). A higher-order factor, Motivational persitence, was specified to capture the shared variance among these first-order factors, representing the overarching construct. This model demonstrated unacceptable fit, with a scaled chi-square = 21136.26 (*df* = 371), *CFI* = 0.910, *TLI* = 0.90, robust *RMSEA* = 0.089 (90% CI [0.088, 0.091]), and SRMR = 0.10. Inspection of the results revealed that the dimensions Ambition, Pursuit of long term goals, Planning, Implementation, and Self-discipline loaded positively and significantly on the higher-order factor of motivational persistence (standardized loadings ranging from β = 0.61 to β = 0.99). However, Recurrence of unattained goals dimension exhibited a small but significant negative loading on the higher-order factor ($\beta = -0.16$, $p < .001$), indicating that higher levels of motivational persistence were associated with lower levels of recurrence. This pattern was inconsistent with theoretical expectations; therefore, this dimension was removed and the CFA was rerun.

Table 4. *Standardized and Unstandardized Factor Loadings for the EPM Questionnaire*

Latent Variable	Indicator	Unstandardized estimate	*SE*	*z*-value	*p*	Standardized estimate
Ambition	I7	.422	.012	35.654	<.001	.737
	I13	.104	.010	10.632	<.001	.182
	I19	.507	.015	33.859	<.001	.885
	I25	.294	.010	29.895	<.001	.514
Pursuit of long-term goals	I2	.126	.007	17.420	<.001	.298
	I8	.310	.011	28.002	<.001	.734
	I14	.295	.010	29.675	<.001	.698
	I20	.380	.014	27.504	<.001	.899
	I26	.202	.008	24.795	<.001	.478
Planning	I3	.610	.009	69.865	<.001	.787
	I9	.658	.009	72.101	<.001	.848
	I15	.585	.009	68.400	<.001	.754
	I21	.648	.009	71.576	<.001	.835
	I27	.472	.011	43.550	<.001	.609
Pursuit of current Goals	I4	.288	.008	35.956	<.001	.529
	I10	.319	.008	38.969	<.001	.586
	I16	.453	.010	43.635	<.001	.831
	I22	.305	.008	39.028	<.001	.559
	I28	.464	.011	43.873	<.001	.851
Self-discipline	I6	.106	.029	3.669	<.001	.741
	I12	.076	.021	3.668	<.001	.528
	I18	.085	.023	3.664	<.001	.594
	I24	.064	.018	3.617	<.001	.446
	I30	.112	.031	3.654	<.001	.783
Motivational persistence	Ambition	1.432	.050	28.460	<.001	.820
	Pursuit of long-term goals	2.145	.088	24.509	<.001	.906
	Planning	.813	.024	34.109	<.001	.631
	Pursuit of current Goals	1.539	.044	35.358	<.001	.839
	Self-discipline	6.900	1.909	3.615	<.001	.990

The revised five-dimensional model demonstrated improved fit, with a chi-square = 9652.59 (*df* = 247), *CFI* = .95, *TLI* = .94, robust *RMSEA* = .096 (90% CI [.095, .098]), and *SRMR* = .082. Unstandardized and standardized factor loadings for this model are presented in Table 4. Examination of the factor loadings indicated that several items showed lower standardized loadings (< .50) on their respective latent dimensions—specifically I13 (Ambition), I2 and I26 (Pursuit of long-term goals), and I24 (Self-discipline). Although factor loadings above .40 are sometimes considered acceptable in the literature (Cheung et al., 2024), we adopted a more conservative approach and removed items with loadings < .50. These items also exhibited relatively high residual variances, further indicating that they were weak indicators of their respective latent constructs and justifying their exclusion from the final model. These items were subsequently removed, which resulted in further improved model fit, with a chi-square = 4880.01 (*df* = 165), *CFI* = .975, *TLI* = .971, robust *RMSEA* = .094 (90% CI [.092, .097]), *SRMR* = .068.

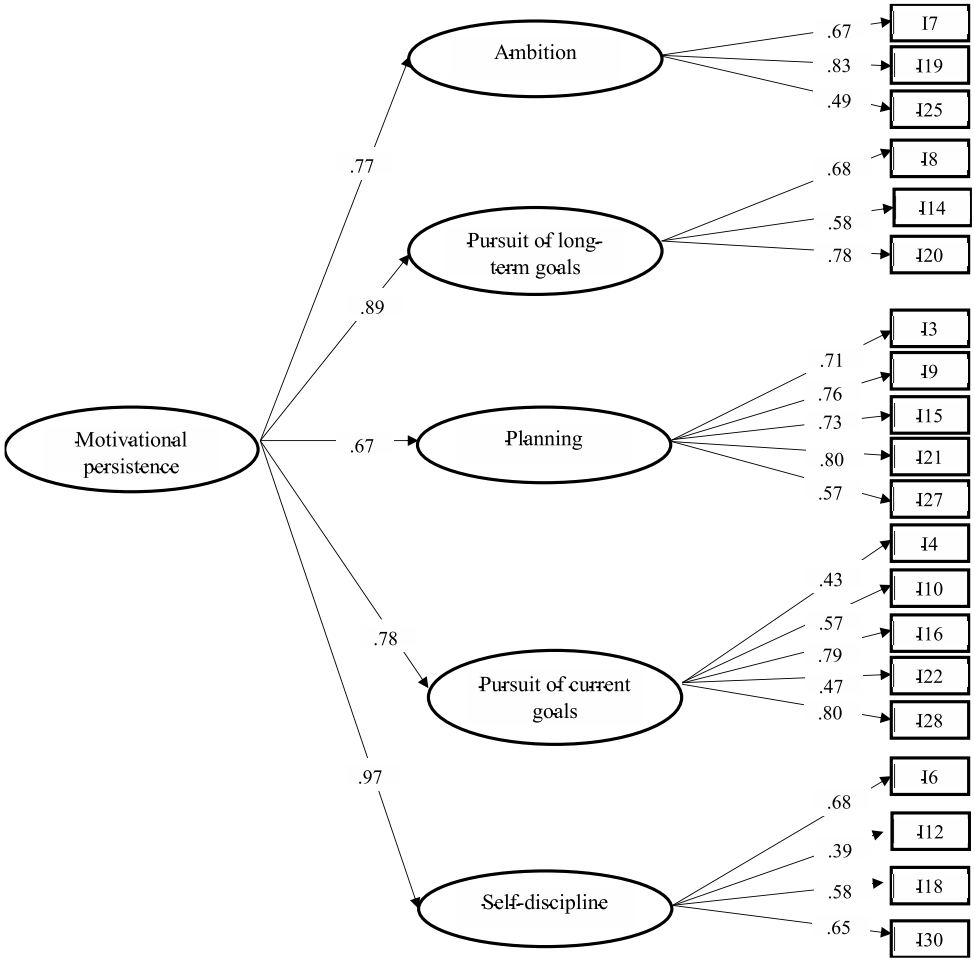

Figure 1. Standardized Factor Loadings Obtained in the Second Sample

This revised version of the questionnaire, resulting from the adjustments based on the results of the first CFA, was subsequently tested on sample 2.The model demonstrated good fit, with a scaled chi-square = 1682.32 (*df* = 165), *CFI* = 0.962, *TLI* = .956, robust *RMSEA* = 0081 (90% CI [.078, .085]), and *SRMR* = .065. Standardized factor loadings are presented in Figure 1. Except for one item with factor loading slightly below the .40 threshold (I12 = .398), all factor loadings were satisfactory, suggesting that the selected items were good indicators of the latent variables.

3.3 Convergent Validity (AVE) and Discriminant Validity (Fornell–Larcker Criterion) Analyses

Table 5 presents the AVE values for each EPM scale, as well as the squared correlations between scales. Three of the five EPM questionnaire scales have adequate AVE values (≥ 0.50), but *Pursuit of current goals* and *Self-discipline* fall slightly below the recommended threshold, suggesting that these scales may not capture their constructs as strongly as the others. Further, results indicate that several scale pairs met the Fornell–Larcker criterion, suggesting adequate discriminant validity for those relationships. However, four scale pairs did not satisfy the criterion. For these scales, the squared latent correlations exceeded the AVE values, indicating potential overlap among the constructs. This suggests that some constructs share substantial variance and may not be fully distinct, with the lower AVE values for Pursuit of current goals and Self-discipline contributing to reduced discriminant validity.

Table 5. *Fornell–Larcker Discriminant Validity Results*

Scale 1	Scale 2	Criterion Met	Squared Correlation	AVE (Scale 1)	AVE (Scale 2)
Ambition	Pursuit of long-term goals	No	.837	.508	.585
Ambition	Planning	Yes	.256	.508	.595
Ambition	Pursuit of current goals	Yes	.389	.508	.466
Ambition	Self-discipline	No	.659	.508	.466
Pursuit of long-term goals	Planning	Yes	.377	.585	.595
Pursuit of long-term goals	Pursuit of current goals	Yes	.533	.585	.466
Pursuit of long-term goals	Self-discipline	No	.752	.585	.466
Planning	Pursuit of current goals	Yes	.286	.595	.466
Planning	Self-discipline	Yes	.416	.595	.466
Pursuit of current goals	Self-discipline	No	.700	.466	.466

Note. AVE = Average Variance Extracted.

3.4 Gender-Based Measurement Invariance Testing

Measurement invariance of the EPM questionnaire was examined across gender using the first sample (3,500 participants). Configural invariance tests whether the factor structure is the same across genders, metric invariance examines whether factor loadings are equivalent, and scalar invariance assesses equality of item intercepts. The model demonstrated acceptable fit at the configural, and scalar levels, with minimal changes in fit indices (see Table 6 for results). Because ΔCFI was less than 0.01, the invariance hypothesis is supported. This indicates that the EPM questionnaire measures constructs equivalently across gender, allowing for meaningful comparison of latent means.

Table 6. *Gender-Based Measurement Invariance of the EPM Questionnaire*

Tested Model	χ^2 *(df)*	*Robust RMSEA [90% CI]*	*CFI*	Model Comparison	*ΔRMSEA*	*ΔCFI*
M1: Configural invariance	5035.65 (330)	.090 [.088, .093]	.975	–	–	–
M2: Metric invariance	5289.71 (349)	.090 [.088, .092]	.974	M1 vs M2	.000	.001
M3: Scalar invariance	5392.34 (403)	.084 [.082, .086]	.973	M2 vs M3	.006	.001

3.5 Correlations Between the Motivational Persistence Measured with the EPM Questionnaire, Character Strenghts, Primal World Beliefs, and Styles of Work

Correlations between motivational persistence measured with the EPM questionnaire and character strengths assessed with the VIA-IS-R are presented in Table 7. With the exception of humility, which showed a non-significant association, all correlations were positive and statistically significant. As expected, motivational persistence showed strong positive correlations with perseverance (r = .628, p < .001) and self-regulation (r = .595, p < .001). Motivational persistence was also moderately to strongly associated with hope (r = .509, p < .001), zest (r = .492, p < .001), curiosity (r = .488, p < .001), and love of learning (r = .461, p < .001). These smaller associations indicate that motivational persistence is connected to, but not redundant with, other positive character traits. Thus, the pattern of results is consistent with expectations and further supports the divergent validity of the questionnaire. The remaining character strengths also showed positive correlations of mostly moderate size (*r*s around .20–.45), including creativity, judgment, perspective, honesty, social intelligence, gratitude, and spirituality. Overall, this pattern of broadly positive but generally lower correlations is to be expected and indicates that motivational persistence is related to a wide range of adaptive character traits while retaining clear distinctiveness, supporting the scale's construct validity.

Table 8 presents the correlations between motivational persistence and primal world beliefs. The results suggest that people who are high in motivational persistence also tend to believe that the world needs their contribution *(r* = .421, p < .001), is meaningful (r = .380, p < .001), just (r = .383, p < .001), and pleasurable (r = .358, p < .001). Participants with high levels of motivational persistence also endorsed other positive views of the world (e.g., they saw the world as improvable, interesting, understandable, regenerative etc.). The pattern of correlations supports the divergent validity of the EPM questionnaire.

Table 7. *Correlations between Motivational Persistence (EPM Total Score) and VIA-IS-R Character Strenghts*

Variable	***r***	***p***
Creativity	.405	<.001
Curiosity	.488	<.001
Judgement	.346	<.001
Love of learning	.461	<.001
Perspective	.465	<.001
Bravery	.354	<.001
Perseverance	.628	<.001
Honesty	.443	<.001
Zest	.492	<.001
Love	.325	<.001
Kindness	.233	<.001
Social intelligence	.391	<.001
Teamwork	.327	<.001
Justice	.358	<.001
Leadership	.364	<.001
Forgiveness	.150	.021
Humility	.035	.595
Prudence	.439	<.001
Self-regulation	.595	<.001
Appreciation of beauty and excellence	.122	.060
Gratitude	.389	<.001
Hope	.509	<.001
Humor	.317	<.001
Spirituality	.368	<.001

Table 8. *Correlations between Motivational Persistence (EPM Total Score) and Primal World Beliefs*

Variable	***r***	***p***
Harmless	.204	< .001
Cooperative	.209	< .001
Just	.383	< .001
Pleasurable	.358	< .001
Progressing	.263	< .001
Regenerative	.308	< .001
Stable	.253	< .001
Abundant	.290	< .001
Beautiful	.278	< .001
Funny	.097	.002

Variable	***r***	***p***
Improvable	.325	< .001
Interesting	.311	< .001
Meaningful	.380	< .001
Worth exploring	.171	< .001
Intentional	.242	< .001
Interactive	–.036	.252
Needs me	.421	< .001
Acceptable	–.136	< .001
Changing	–.031	.314
Hierarchical	.115	< .001
Interconnected	.122	< .001
Understandable	.330	< .001

Correlations between motivational persistence and work styles are presented in Table 9. The results align with theoretical expectations, the strongest associations being observed for planned versus spontaneous work ($r = –.449$, $p < .001$), energetic versus exhausted ($r = –.455$, $p < .001$), and motivated versus demotivated ($r = .402$, $p < .001$). These findings suggest that participants high in motivational persistence tend to approach tasks in a more structured and planned manner and have higher levels of energy and motivation. Other correlations were smaller but still in the expected direction (e.g., motivational persistence is associated with lower levels of impulsivity), further supporting the validity of the EPM questionnaire.

Table 9. *Correlations between Motivational Persistence (EPM Total Score) and Styles of Work*

Variable	***r***	***p***
Adaptative – innovative	.003	.913
Planned – spontaneous	-.449	<.001
Dependent – independent	.062	.021
Individualist – collectivist	.092	.001
Dedicated – detached	-.126	<.001
Relaxed – tense	.163	<.001
Impulsive – controlled	.245	<.001
Analytic – intuitive	-.315	<.001
Demotivated – motivated	.402	<.001
Energetic – exhausted	-.455	<.001

Note. For the SWQ scales, higher scores indicate stronger endorsement of the right-hand pole of each bipolar variable (e.g., higher exhaustion on the Energetic-exhausted scale).

4. Discussion

This study aimed to evaluate the updated version of the EPM questionnaire. The original instrument (Constantin et al., 2011) included three subscales (i.e., Pursuit of long-term goals, Pursuit of current goals, and Recurrence of unattained goals). The revised version expanded the questionnaire by adding three new subscales: Ambition, Planning, and Self-Discipline, with the goal of capturing additional aspects of motivational persistence. To test the adequacy of the updated measure, the study examined the internal consistency of each scale, the factorial structure of the questionnaire, and its convergent and discriminant validity, as well as measurement invariance across gender

In general, the scales demonstrated good internal consistency. Cronbach's alpha exceeded .70 for all scales except for Ambition. The problematic item in the Ambition scale was Item 1 ("I like to set simple and easy-to-reach objectives for myself"), which was intended to be reverse-scored. However, this item may not adequately capture the construct of Ambition. Preferring simple, easy-to-achieve goals does not automatically mean that a person avoids or dislikes challenging, ambitious goals. These two tendencies are not perfect opposites, and the item therefore fails to capture the intended reversed meaning of ambition. For this reason, it was removed from the current version of the scale. Following the CFA analyses, one additional item from the Ambition scale was removed, leaving the scale with only three items. This is not ideal and may contribute to lower internal consistency. Therefore, future versions of the EPM questionnaire could consider adding new items that better assess ambition, either directly or in reverse form. For example, Item 1 could be reformulated as: "I do not like to set difficult, ambitious goals for myself," in order to preserve the reversed structure. Additionally, future versions of the questionnaire might also include an extra item for the Self-discipline scale, as this scale showed the lowest composite reliability.

Further, CFA showed that Recurrence of unattained goals loaded only weakly and negatively onto the motivational persistence factor. This result suggests that Recurrence of unattained goals is not actually a dimension of the higher-order construct of motivational persistence. There may be several explanations for this. One possibility is that individuals with high motivational persistence tend to accomplish most of their goals; therefore, they are less likely to have important objectives left unfinished or abandoned in the past, and thus have fewer goals to return to later. Moreover, the Recurrence of unattained goals subscale may capture a construct that is conceptually distinct from motivational persistence. Instead of reflecting sustained effort toward long-term objectives, returning to unfinished goals may indicate tendencies such as rumination and difficulty letting go of previous commitments that ultimately proved unfeasible. In this view, revisiting unattained goals may indicate an inefficient style of goal management rather than motivational persistence, which would explain its weak association with motivational persistence. Therefore, we decided to exclude Recurrence of unattained goals from the final version of the EPM scale. Nevertheless, future research should further investigate the relationship between motivational persistence and the recurrence of unattained goals.

The results of the CFA also led to the removal of several items with lower factor loadings, specifically, I13, I2, I26, and I24. Notably, three of these were reverse-scored items. It is possible that, in a large sample of 3,500 participants, some individuals may have overlooked the reversed wording, which could explain these findings. The removal of these items resulted in improved CFA fit indices. A major strength of our study is that the revised model, resulting from the elimination of these items and the Recurrence of unattained goals subscale, was subsequently tested on an additional sample. The analyses confirmed that the model demonstrated good fit, supporting the robustness of the updated structure.

Despite satisfactory results in the CFA, convergent validity analyses indicated relatively low AVE values for the Pursuit of current goals and Self-discipline subscales. Therefore, future revisions of the instrument could focus on refining items to better capture these constructs and enhance their convergent

validity. Regarding discriminant validity, several subscale pairs met the Fornell–Larcker criterion, indicating adequate discriminant validity for those relationships. However, some subscale pairs did not satisfy this criterion. Specifically, the pairs Ambition – Pursuit of long-term goals, Ambition – Self-discipline, Pursuit of long-Term goals – Self-discipline, and Pursuit of current goals – Self-discipline did not meet the Fornell–Larcker criterion. Although these results suggest potential issues, we retained these subscales provisionally, with the aim of improving them in future iterations. This decision was based on both theoretical and practical considerations. First, Ambition and Pursuit of long-term goals are conceptually distinct. Setting ambitious goals does not necessarily imply the capacity for sustained effort and persistence required to achieve them. One can be highly ambitious yet lack the long-term persistence needed for goal completion. Conversely, dedicated pursuit of long-term goals does not always involve ambitious objectives. Individuals may choose modest long-term goals that provide psychological comfort ("I am doing something for myself and my future") without requiring exceptional effort or mobilization of motivation. Identifying discrepancies between ambition and pursuit of long-term goals, even if rare, can be important in psychological assessment, as they help explain individual behavior or performance patterns.

Similarly, Ambition should also differ from Self-discipline. A person can be ambitious but lack the self-discipline necessary to accomplish their goals. Moreover, as discussed in the Introduction, an individual may demonstrate high self-discipline in managing immediate impulses yet fail to consistently pursue long-term goals, highlighting that the subscales Self-discipline and Long-term goal pursuit should capture different constructs.

Finally, if Pursuit of current goals focuses on executing plans at the daily or short-term level, Self-Discipline an enduring capacity for behavioral regulation. Whereas pursuing current goals measures whether someone completes specific tasks or follows a schedule (i.e., puts the plans they have formulated into action), self-discipline represents supports adherence to personal standards/ commitments, even in the absence of immediate plans. We anticipate that refining the items of these scales to better capture these conceptual nuances will improve their discriminant validity in future revisions of the instrument.

The results provide evidence that the instrument demonstrates measurement invariance across gender, indicating that the EPM questionnaire functions equivalently for both genders. Therefore, the EPM questionnaire can be reliably used to compare motivational persistence between men and women. This allows researchers and practitioners to interpret group differences with confidence, knowing that observed differences are due to true variations in motivational traits rather than measurement artifacts.

Convergent validity was further supported through significant correlations between the EPM questionnaire and both the VIA-IS-R (McGrath, 2019) and the Work Styles Questionnaire (Constantin et al., 2010). As expected, motivational persistence showed strong positive correlations with perseverance and self-regulation measured by the VIA-IS-R. In addition, the robust correlations between EPM dimensions and planned, energetic, and motivated workstyles further underscore the instrument's relevance for assessing motivational traits in both professional and academic contexts. These findings indicate that individuals with higher levels of persistence tend to adopt structured, proactive approaches to work, demonstrate greater energy and motivation, and show enhanced resilience in overcoming obstacles and distractions. Discriminant validity of the EPM questionnaire was also supported through its relationships with the PI (Clifton et al., 2019), which assess fundamental beliefs about the world. The observed weak to moderate correlations suggest that motivational persistence is conceptually distinct from broader worldview constructs, reinforcing its specificity as a trait that influences behavior independently of general cognitive schemas or personality dimensions.

Several limitations of the present study should be acknowledged. First, although the

study included a very large and relatively diverse sample, it relied on a convenience sample, primarily composed of employees and university students. This may limit the generalizability of the findings to other populations, such as unemployed individuals, people from different cultural or socio-economic backgrounds, or those with lower levels of education. Future studies should aim to recruit more diverse, probability-based, or cross-cultural samples to further examine the robustness and generalizability of the EPM questionnaire. Second, some of the measures administered alongside the EPM displayed relatively low internal consistency. Therefore, any associations involving these measures should be interpreted cautiously, as limited reliability may have weakened the observed relationships. Third, test-retest reliability was not examined. Assessing temporal stability is important to confirm that the instrument reliably measures motivational persistence over time, especially since motivational persistence is theoretically assumed be a relatively stable trait. Additionally, the criterion-related validity of the EPM questionnaire was not assessed in the present study. Future research could address this by examining how scores on the EPM predict relevant real-world outcomes, such as academic and job performance, which should ideally not be self-reported. Longitudinal designs would be particularly valuable to assess the predictive validity of the instrument over time. Additionally, once the scales of the EPM questionnare are refined in future iterations of the questionnaire, it will be important to conduct cross-cultural validation studies. Although the previous version of the EPM questionnaire has already been validated in other cultural contexts (e.g., Quintana et al., 2022), the revised version may function differently across populations. Testing the updated EPM across diverse cultural contexts will help determine whether it measures the same constructs equivalently and may reveal culturally specific patterns in motivational traits.

To conclude, the results of the present study suggest that the inclusion of new subscales in the EPM questionnaire shows promise. Overall, the subscales demonstrated good internal consistency, and the factorial structure of the questionnaire exhibited a good fit in confirmatory factor analyses. Nevertheless, further refinement of the instrument is needed to enhance both convergent and discriminant validity. Future research should also evaluate whether all five subscales should be retained or whether a more parsimonious version of the questionnaire—with fewer subscales—would be better supported empirically.

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PUBLISHING STANDARDS

Psychology of Human Resources – guide for authors

THE EDITORS

This document represents the "Guide for Authors". It covers the format and language to be used for manuscripts submitted to Human Resources Psychology. Also, this document can be found on the webpage of the Romanian Association of Industrial and Organizational Psychology (www.apio.ro).

This "Guide for Authors" follows the 7th APA Publication Manual.

Manuscript Submission and Format

All manuscripts for the journal Human Resources Psychology should be submitted to the following e-mail address: revista@apio.ro.

To edit the manuscript please use Times New Roman 12-point type, 1.5 line spacing and the A4 page setting. Each page will be numbered in the upper right corner. The top and side margins should be left of at least one inch or 2.54 cm. A full example of a manuscript can be found in the 7th APA Publication Manual.

Publications

Accepted papers are copy-edited and retyped. Authors have to review edits and proofread their work. The editor of Human Resources Psychology will contact the corresponding author after the editor assigns your work to an issue.

If your work is accepted, please keep the editor informed of changes in your contact information and of long absences.

Front Page

The first page of the manuscript should include the following information:

1. Title

The title should be a concise statement of the main topic and should identify the variables or theoretical issues under investigation and the relationship between them. It should be typed in sentence case, centered between left and right margins, and positioned in the upper half of the page.

2. Author name(s) and institutional affiliation(s)

Author name(s) will be presented in the following form: first name, middle initial(s), and last name.

Institutional affiliation should reflect the institution/location where the author(s) were when the research was conducted. When an author has no institutional affiliation, the city and state of residence below the author´s name should be specified. The institutional affiliation should be centered under the author's name, on the next line.

3. Author´s note

This section should include the following:

- First paragraph should include the departmental affiliations at the time of the study for all authors as follows: name of the author as it appears in the byline, comma, department name, comma, university name, semicolon, next

author name, and so on, and end with a period.
- Second paragraph should include any changes in author affiliation subsequent to the time of the study as follows: [author´s name] is now at [affiliation].
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- Fourth paragraph should include information about the person to contact in terms of mailing address and e-mail.

Place the author note on the title page, below the title, byline, and affiliation. Center the label *Author Note.* Start each paragraph of the note with an indent, and type separate paragraphs for the authors' names and current affiliations, changes in affiliations, acknowledgments, and special circumstances, if any, along with the person to contact. The author note is not numbered or cited in the text.

Abstract Page

The abstract as well as the title of the work go on page 2. The abstract should be no longer than 150 words. The label *Abstract* should appear in sentence case, centered, at the top of the page. Type the abstract itself as a single paragraph without paragraph indentation. Place a running head (short title).

The abstract will be written in English. It is necessary to include 3-5 key words after each abstract, in all these three languages.

Main body text pages

In preparing your manuscript, begin the introduction on page 3. Type the title of the manuscript in sentence case centered at the top of the page, and then type the text. The remaining sections of the article follow each other without a break; do not start a new page when a new heading occurs.

This section should include the following:

- Introduction of the problem. This section will present the specific problem under the study and describe the research strategy. There is no need to label this section as Introduction.
- Explore importance of the problem. This section states why the problem deserves new research. State explicitly this problem according to the type of the study (empirical study, literature review and meta-analysis, methodological paper and case study).
- Describe relevant scholarship by discussing the relevant related literature and demonstrating the logical continuity between previous and present work.
- State each tested hypothesis clearly and provide a theoretical argument for how it was derived from theory or is logically connected to previous data and argumentation.

Method

This section describes in detail how the study was conducted, including conceptual and operational definitions of the variables used in the study. Authors should include the following:

- Sample description, by describing the main characteristics with particular emphasis on characteristics that may have bearing on the interpretation of results.
- Sampling procedure by describing the procedures for selecting participants in terms of sampling method, the percentage of the sample approached that participated, the number of participants who selected themselves into the sample.
- Sample size, power and precision.
- Measures and covariates by describing the methods used to collect data and to enhance the quality of the measurements.
- Research design.
- Experimental manipulations or procedures.
- Task description.

Results

This section summarizes the collected data and the analysis performed on the data to test the proposed hypotheses. Report the data analysis in sufficient detail to justify your conclusions. For more information please consult the 6th APA Publication Manual.

Discussion

This section evaluates and interprets the implications of the results, especially with respect to original hypotheses. Examine, interpret, and qualify the results and draw inferences and conclusions from them. Emphasize any theoretical or practical consequences of the results.

Also, the limits of the study and possible future studies can be considered in this section.

References

References are your entries in the *alphabetical list at the end* of your article or research note. This list should include all the works you have cited throughout the manuscript. The references should be formatted as follows:

1. Periodicals (selective examples)

Author, A.A, Author, B. B., & Author, C. C. (year). Title of article. *Title* of *Periodical, xx,* pp-pp. doi: xx.xxxxxxxxxx

Author, A. A., Author, B. B., Author, C. C., Author, D. D., Author, E. E., Author, F.F., … Author, Y.Y. (year). Title of article. *Title* of *Periodical, xx,* pp-pp. doi: xx.xxxxxxxxxx

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Author, A.A., & Author, B.B. (in press). Title of article. *Title of Periodical.* Retrieved from http://cogprints.org/5780/1/ECSRAP.F07.pdf

2. Books

Author, A. A. (year). *Title of work.* Publisher.

Author, A. A. (year). *Title of work.* Retrieved from http://www.xxxxxxx

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3. For chapters in a book or entry in a reference book (selective example)

Author, A.A., & Author, B.B. (year). Title of chapter or entry. In A. Editor, B. Editor, & C. Editor (Eds.), *Title of book* (pp. xxx-xxx). Publisher.

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Author, A.A., & Author, B.B. (year). Title of chapter or entry. In A. Editor, B. Editor, & C. Editor (Eds.), *Title of book* (pp. xxx-xxx). Publisher. doi: xxxxxxxx

4. Meeting and symposia (selective examples)

Contributor, A.A., Contributor, B.B., Contributor, C.C., & Contributor, D.D. (Year, Month). Title of contribution. In E.E. Chairperson (Chair), *Title of symposium.* Symposium conducted at the meeting of Organization Name, Location.

Presenter, A.A. (Year, Month). *Title of paper or poster.* Paper or poster session presented at the meeting of Organization Name, Location.

5. Unpublished works (selective examples)

Author, A.A. (Year). Title of manuscript. Unpublished manuscript [or "Manuscript submitted for publication," or "Manuscript in preparation"].

For a detailed description of the procedure related to the citation of other types of work than those listed above, consult the 6th APA Publication Manual.

Footnotes

Footnotes are used to provide additional content or to acknowledge copyright permission status.

Appendices

The appendices of the manuscript (labeled APPENDIX A, APPENDIX B etc.) contain materials that supplements article content such as lengthy methodological procedures, calculations of measures, scales etc.

Tables and Figures

The author should number all tables and figures with Arabic numerals in the order in which they are first mentioned in the text, regardless of whether a more detailed discussion of the table or figure occurs later in the paper. The author should label them as Table 1, Table 2, and so on or Figure 1, Figure 2, and so on. List all tables first followed by figures. Place tables and figures after appendices at the end of the manuscript, and indicate the position of each in the text as follows:

Insert Table 1 about here

Each table or figure needs an introductory sentence in your text. The format agreed is the standard (canonical) one. Each table should report one type of analysis (which is identified in the title), and each vertical column and horizontal row should contain only one type of data.

Citation

It is important to put in the Reference section every work you have cited throughout the manuscript. The author can cite in-text as follows:

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Name and year: It has been found that X is associated with Y (Author, year)

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When a work has two authors, the author should cite both names every time the reference occurs in the text.

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When a work has no identified author, the author should cite in text the first few words of the reference list entry (usually the title) and the year. Use double quotation marks around the title of an article, a chapter, or a web page and italicize the title of a periodical, a book, a brochure, or a report:

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(Johnny, 2011, p. 13)

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Minnie's report (as cited in Smith, 2011).

Thank you for paying attention to the conventions outlined in this guide – it will help the work of everyone involved in the publication of this journal.